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Grand Central Terminal and Rockefeller Center

**A Historic-critical Estimate of
Their Significance**

NEW YORK STATE PARKS & RECREATION
DIVISION FOR HISTORIC PRESERVATION

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GRAND CENTRAL TERMINAL AND ROCKEFELLER CENTER
A Historic-critical Estimate of Their Significance

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Foreward

To some, this report on the Grand Central Terminal and the Rockefeller Center might be considered a little unusual for a historic preservation agency to be involved with. However, these developments have played a significant part in the social and economic history of not only the city of New York but in providing basic principles that have guided our urban development during a time when the world was experiencing one of its periods of greatest cultural, economic and social growth.

The Grand Central Terminal, with its Park Avenue development, resulting from the Grand Central Terminal concept, and the Rockefeller Center, with its people and open space and off-the-street services, are truly historic symbols of progress in efficient and effective urban development. The New York State Historic Trust initiated this study and its successor, the New York State Board for Historic Preservation, carried it to its conclusion. It is through such common interests and understanding that preservation of our most significant resources can be assured.

Conrad L. Wirth



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Introduction

The urbanization of Manhattan Island has proceeded from South to North from the first day of settlement. But the process saw an enormous acceleration in the Nineteenth Century, especially after the War of 1812, when a soaring population rate was reflected in the expansion of the built-up area of the city (Fig. 1). Independent settlements, like the villages of Greenwich and Harlem, were encapsulated in the advancing urban tissue, which also blotted out the open farm lands in between. In the earlier years of northward expansion, when the rate of growth was slower, the city tended to replace rural land uses with its own suburbs. These, in turn, were replaced by successive waves of rebuilding, always denser and more urban in texture.

But after the mid-century, the character of this expansion altered. The change was already forecast in the Commissioners' Map of New York City of 1811 * (Fig. 2). Now farms, forests and bogs were to be converted directly into a solid grid of built-up rectangular blocks. (Central Park had not yet been conceived of; and the wandering streets of lower Manhattan were to be abandoned; given the hilly nature of the terrain, an enormous amount of cutting, filling and drainage must have been anticipated.) Upon the basis of this planar geometry, the remorseless obliteration of the landscape — glimpses of which can still be seen in Central Park — proceeded.

First Broadway and then Fifth Avenue, above its beginning at Washington Square, were to serve as the centroids of advance; along them the new urban tissue developed like crystals precipitated along a wire submerged in a rich chemical solution. In the forefront of this expansion were, typically, upper-class town houses. Immediately in their wake came all the institutions which served them: the fashionable churches, clubs and theaters; the great hotels and restaurants; the big department stores and specialty shops. This upper-class development up the spine of the Island was paced by a parallel development of piers and warehouses along both the Hudson and East Rivers. Between them and the central spine rose two bands of working-class slums: the Jewish ghetto on the East Side was neatly balanced by the notorious Irish ghetto of the Tenderloin in the western Thirties. New York thus became one of the few great cities of the world to turn its back upon the water-body which served it — a situation which was only tardily and partially corrected with the opening of Riverside Drive in 1891 and the much later development of F.D.R. Drive in the 1930's.

By the second half of the Nineteenth Century, this rush to the North, along the parallel axes of Madison, Fifth and Sixth avenues and Broadway, had become

irresistible. Great department stores like Wanamaker's, Lord and Taylor's, Macy's and Gimbel's were leap-frogging over one another up the island for over a century; and the recent construction of Gimbel's new store at Lexington and 86th Streets serves to show that this current is not yet played out. A decade was sufficient to see open farmland converted into densely developed, very valuable residential and commercial tissue.

By the same token, another decade or two would be sufficient to reduce its status, lower its tone, convert it into second-class uses. The obverse of accelerated growth was accelerated obsolescence. For more than a century Broadway has experienced this phenomenon; and much of Fifth Avenue between 34th and 14th streets still does today. (Of course, an urban area need be neither rich, new, nor beautiful to be viable; and the wholesale and light manufacturing activities which moved into the voids left by fashionable immigration have always been vital to the city's over-all economy. But they represent a less than optimal exploitation of the territory they occupy.)

Only three projects in Manhattan's history have been able to slow down, much less to stop or reverse, this remorseless process of expansion and decay: Central Park (begun 1855), Grand Central Terminal (begun 1904), and Rockefeller Center (begun 1932). But it would be an error to think that their historic significance lies in the negative act of having halted some putative line of "progress". On the contrary, they are significant for having served to polarize the forces of growth, thus acting to stabilize the whole center of the island rather like the electro-gyroscopes employed on large ocean liners. They have not been passive containers of urban activity; instead they have acted as generators of new urban energies, infusing the urban tissues around them with nourishment and strength. This capacity is a mysterious one in urban affairs, not much analyzed and never adequately explained. It is the purpose of this study to do so for the Grand Central Terminal and Rockefeller Center.

The Grand Central Terminal

The present Grand Central Terminal stands on a site which has been occupied by a series of railroad stations for just over a century. Cornelius Vanderbilt, the railroad tycoon, was authorized by the State of New York to erect a new station on the grounds in May of 1869; construction began that same year and the new station was opened two years later.¹

Manhattan Island had been connected to the mainland since the 1830's by the New York and Harlem Railroad and the New York and New Haven Railroad, whose lines ran down Fourth Avenue to a terminal at 26th Street, and by the Hudson River Railroad** from

**An Act of the New York Legislature in 1807 created a new board of three Commissioners whose assignment it was to prepare "final and Conclusive" maps for the future development of the city. The Commissioners' Plan was the result.*

***By an Act of the New York State Legislature in 1846, the newly-formed Hudson River Railroad had been granted all of the east bank of the Hudson from Spuyten Duyvil down to 68th Street and as far inland as present-day West End Avenue.*

Albany, whose tracks ran down the Hudson River waterfront to a terminus at Tenth Avenue and 30th Street. But the conflict between the surface tracks of these railroads and the life of the city was continuous and increasing. The reasons were many: the danger of grade-level crossings to pedestrians and horse-drawn traffic; the nuisance of noise, dirt and fire (sparks from the wood-burning locomotives were a constant hazard); and the general depression of real estate values along the rights-of-way. In 1857, the city had banned the use of steam locomotives south of 42nd Street, forcing the railroads to uncouple the cars and tow them down to the depot by horses. All of these factors were to force the railways to pull back their terminals to the north. Ultimately, they would compel them to place their trackage either above or below grade.

Thus the Commodore's decision to build a "Grand Central Depot" – the very terminology is redolent of the times – was opportune, the more so since, having recently acquired financial control of all the roads, he was able to consolidate them physically as well. In 1869, he launched his plan to bring together all the tracks at a new yard in Mott Haven, in what is now the Bronx, and then down into Manhattan across the Harlem River, along the Harlem line.² Even to call the Depot "central" was a measure of his perspicacity. It is true that new construction was pressing north toward 42nd Street and beyond, and Fifth Avenue immediately to the west of the proposed site of the station was already a fashionable neighborhood.³ Such projects as the ill-fated Crystal Palace* had drawn attention to the area. But the site was jerringly described as "the end of the world" and the city's decision to let the Commodore build there seemed to confirm it.

The site of the proposed depot was already occupied by railroad buildings: an 1859 map indicates that already along Fourth Avenue, between 42nd and 44th Streets, there were two locomotive houses, a depot, a car house, stables and "shoeing shop" for the horses which had pulled the cars down to Madison Square.⁴ Now Vanderbilt acquired additional property for storage and marshalling yards between Madison and Lexington running as far north as 48th Street. By these far-sighted additions practically all of the present ground area of the present-day complex was acquired. The first foundation stone was laid on September 1, 1869, and the station was completed by October, 1871. In the first year, the depot handled an average of 164 long distance and commuting trains per day.⁵

In plan and architectural design, the new depot, designed by the architect John B. Snook, was unexceptional. It was neither especially large nor grandiose, compared to contemporary European

*Built in 1853, where the New York Public Library now stands, it was destroyed in a spectacular 20-minute fire in 1858 even though, ironically, it stood cheek by jowl with the Reservoir.

terminals.** Of the so-called "head house" type, it had an end-of-the-line plan, in which trains either backed in or backed out, in contrast to those like Pennsylvania Station, where the trains run through. Initially, it was built to look like three pavilions with connecting links, in red brick and cast iron trim, with the mansard roofs and corrupt Italianate detail characteristic of the American Second Empire style (Figs. 3, 4). The depot proper was rectilinear in plan, with separate waiting rooms – one for each of the three lines – and other facilities grouped across the south front and along the west side of the train shed. Railroad offices occupied the upper floors.

If the head house proper was conventional for its time, the train shed was unusual (Fig. 5). Designed by the engineer R. G. Hatfield as a light cylindrical vault, 530 feet long with a clear span of 200 feet and a rise at the crown of 100 feet, the shed was framed of thirty arched Howe trusses of wrought iron whose lower chords were connected by iron tie-rods below the tracks to take the horizontal thrust. Longitudinal trusses acted as stiffeners for the vault, which was sheathed in corrugated iron and lighted by three great glazed monitors. The northern end of the shed was enclosed by a glass and metal screen, including sheet iron doors which closed off each track⁶ (Fig. 5; see also Fig. 9 for exterior view of this curtain wall).

But a grade-level station house was the least of the problems facing the developers of the depot complex. The question of the tracks remained. Because of the topography of the island, the tracks ran on a raised masonry viaduct as far south as 96th Street. There, because of a rise in the terrain, they entered a cut through solid rock which extended to about 68th Street. From there down to the Terminal they ran along the surface, dropping at a 1-1/4% grade from 56th Street on. Moreover, from 49th to 42nd Streets, the yards with their engine houses and machine shops occupied a great rectangle which extended from Lexington west to Madison. Thus, whether elevated, submerged or at grade, the heavily-travelled lines presented almost insuperable obstacles to normal urban traffic. All this made a fundamental solution imperative.⁷

Hardly had the new depot been completed, therefore, when a comprehensive new scheme for relocating the trackage was announced by the Vanderbilt interests. Dubbed the Fourth Avenue Improvement Scheme and placed under the direction of the engineers Isaac C. Buckhout, Wilfred W. Craven, Allan Campbell, and Edward H. Tracy, the project was completed between the years 1872 and 1874. In this new project the tracks between the station and 56th

**In London, the second Paddington Station by Brunel and Wyatt had been finished in 1854, and St. Pancras, by Scott, in 1876; in Paris, the Gare de l'Est by Duquesney was finished in 1852 and the second and enlarged Gare du Nord was built by Hittorf and Reynaud between 1861-65. The great stations of Germany, Austria, and Italy were somewhat later.

Street were lowered below street level — though not enough to permit on-grade bridges (Figs. 6, 8). From there to 96th Street they were carried in a rock-cut tunnel and then, where the terrain dropped sharply toward Harlem, they ran out onto the masonry viaduct which carried them up to 133rd Street. Between 45th and 56th Streets there were eight elevated foot bridges (Fig. 6); bridges at 45th and again at 48th Streets carried both pedestrian and vehicular traffic across the station yards⁸ (Fig. 8).

But the part of the scheme which attracted the most favorable comment — and which was to lead ultimately to the transformation of a seedy Fourth Avenue into fashionable Park Avenue — was the creation of a landscaped strip down the center of the stretch between 56th and 96th Streets. (Fig. 7). Actually the lid of the tunnel, this series of landscaped plots was a frame for a continuous line of smoke vents for the coal-burning locomotives (and they must have looked like nothing so much as the fumaroles around an active volcano!). The costs of these improvements were divided between the railroad and the city.⁹

The expansion of railroad traffic during the closing years of the century placed continuous stress upon the physical plant. In 1885-86, the yards were enlarged and re-arranged and new switches and signals installed.¹⁰ Facilities for repairing, cleaning and storage of locomotives and cars for through passenger trains were moved northward to Mott Haven.¹¹ Meanwhile, a new train shed with seven new tracks was added to the east of the original, bringing the new total to eighteen¹² (Fig. 9). Then, in 1898, the depot building itself was enlarged: three floors were added, the mansard roofs replaced with domes and the entire facade unified with rusticated stucco (Fig. 10).

These changes were apparently inadequate, for two years later the public areas of the station were reorganized to provide for a central concourse that gave onto all surrounding streets and a single waiting room to replace the three which had hitherto been maintained by the three lines. It is a significant comment on the times that the management found it appropriate to create a new waiting room for immigrants in the basement to relieve, as one account put it, “the main waiting room and rotunda of this class of passenger entirely.”¹³ These were the peak years of Middle European immigration to the Great Lake cities and the upper Midwest, and this new facility was an expression of the importance of this traffic to the New York Central.

But all of these measures were ultimately stop-gaps, palliatives. The remodeled terminal building was not adequate to handle the rising tide of suburban and long distance passenger traffic. And the only partially submerged trackage left unresolved the fundamental circulatory conflict between city streets and rail lines. Even the tunneled portion was unsatis-

factory: smoke removal was not adequate, making for passenger discomfort, especially in summer, and dangerous operating conditions for the crew because of reduced visibility. Smoke caused a serious accident in the tunnel in January, 1902, in which seventeen people lost their lives. Such accidents merely served to accelerate the demand for the only logical answers — complete submersion and electrification — a demand first raised by property owners along the rights-of-way.¹⁴

The application of electric motors to surface traction was already an established technology by 1900. Electric trolleys were a commonplace on both sides of the Atlantic.* Heavy-duty electric locomotives were already being manufactured by General Electric in 1895.** And work on the Paris Metro, begun in 1898, had already led to the opening of one line in July, 1900.¹⁵ Thus the fundamental means of breaking the log jam was at hand and, according to the Central's chief engineer, plans for electrification were already underway before the 1902 accident had occurred.¹⁶

Other even more immediate pressures were at hand. The Pennsylvania Railroad, the Central's chief rival for traffic to Chicago and the Mid-west, had already announced its plans to enter Manhattan via a tunnel under the Hudson River and to erect a new, all-electric terminal on the West Side.*** The New York City Board of Rapid Transit Commissioners, furthermore, was planning a subway, and there was the danger that the Board “might by law secure the right to route their subway beneath the terminal” and thus pre-empt the chance of future underground exploitation by the railroad.¹⁷

On March 19, 1903, Wilgus (by then vice-president of the New York Central) was able to present his scheme for a new station to the president of the railroad. In its essential features this project, to be called the Grand Central Terminal, solved all the major problems confronting the line — and solved them in a manner so advanced that, two-thirds of a century later, the Terminal is still entirely viable. Wilgus's

*The first successful electric-powered street cars in the USA began running in Richmond, Va., in 1888. In New York City, the first electric trolleys appeared on the Third Avenue Surface Line on October 23, 1899. The first electric train ran on the Second Avenue Elevated on November 22, 1900. The use of electric traction on the proposed new subway system was voted by the Rapid Transit Commission in its session of January 9, 1900.

**The electric-powered locomotive was first employed in this country in 1895 by the Baltimore and Ohio Railroad to pull its trains through its tunnel under downtown Baltimore.

***Designed by the prestigious firm of McKim, Meade and White, the “Roman styled” terminal was already under construction by 1906 and completed in 1910. A much simpler construction job than the Grand Central, the Pennsylvania Station initially employed electric locomotives to pull long-distance trains from the station to Manhattan Transfer in the Jersey Meadows, where steam locomotives took over.

initial proposal covered all the main features, though not all of the detailed refinements, of the completed Terminal:

Complete submergence of all tracks from 97th Street south into the Terminal itself. Complete electrification as far north as Mott Haven. [It was ultimately to extend to Harmon on the Albany line and all the way to Boston on the New York and New Haven.]

A complete re-systematization of all grades and levels so as to retard incoming and facilitate acceleration of outgoing trains and to permit the use of ramps instead of stairways from Concourse down to train platforms. Introduction of two levels of trackage in Terminal proper, one for long-distance and one for commuter trains.

Extension of Park Avenue south of 45th Street. [In the final designs, Park was to be carried around the Terminal, across 42nd and ramped down to grade at 40th Street.]

Utilization of air-rights over the relatively huge area between 42nd and 50th and Lexington and Madison for new revenue-producing structures. [This was to be a pioneer application of a principal now used the world over. Implicit in the plan were provisions to be made for underground connections with future rapid transit lines; and it was expected that suburban passenger traffic would be increased by three or four times.]¹⁸

History was to prove this an epochal scheme. What seems so impressive about it in retrospect is the fact that, after decades of backing and filling, improvisation and make-do, so truly comprehensive a scheme was adopted. As the new *Town Planning Review* of Liverpool was quick to recognize in an early issue, the solution was a broadly urbanistic, not a narrowly architectural, one.¹⁹ It was to convert the Terminal complex from an inert obstacle to urban development into a dynamic reciprocating engine for urban activity.

Following the acceptance of the Wilgus report, plans for the new Terminal were requested on a competitive basis from a selected list of architectural firms. As is often the case in such big commissions, other factors than sheer professional ability seem to have played a large role in the final selection of the architects. Four firms were initially invited to participate: Daniel H. Burnham; McKim, Meade and White; Samuel Huckel; and Reed and Stem. (The very selection seems arbitrary, since the first two firms were internationally famous for their work on the Chicago Columbian Exposition of 1893, while the other two were relatively unknown.) The design of Reed and Stem was accepted, nominally because it called for an elevated driveway around the Terminal,²⁰ but the fact that Charles A. Reed was Wilgus's brother-in-law may have played some role in the selection. Such familial connections certainly seem to have been a

factor subsequently, for a firm hitherto not mentioned unexpectedly submitted another design for the Terminal without Reed and Stem's knowledge. The firm was Warren and Wetmore, whose senior member, Whitney Warren, was a cousin of William K. Vanderbilt, the then Chairman of the Board of the New York Central. By all accounts, this new design was less advanced than the premiated one, since it abandoned the concept of exploiting air rights over the yards and dropped the proposed elevated extension of Park Avenue around the Terminal and across 42nd Street. Nevertheless, doubtless because of invisible pressures, a new association between the two firms was announced, with Charles A. Reed to be executive head of the firm.

Initially, the Terminal design reflected the Warren and Wetmore modifications. But in 1909, the plans were again revised to reinstate the main features of the Reed and Stem scheme: the elevated driveway, the bridge across 42nd Street and ramp down to grade at 40th and piers for future office buildings. Reed died in 1911; after that, Whitney Warren became head of the associated architects and, more and more, Warren and Wetmore came to receive credit for the design.* Wilgus had already retired in 1907, after a quarrel with the Board of Directors, to be replaced by George W. Kittredge.

Construction of the new Terminal was actually to take almost ten years – from June, 1903, to February, 1913. The slow pace is easy enough to understand, since uninterrupted service had to be maintained throughout the entire period and it had already increased in volume from 500 trains per day in 1903 to over 600 in 1906.²¹ Some idea of the complexity of the problem and the adroitness of its resolution is clear from a construction photograph taken in 1909 (Fig. 11). Already in 1907, the work accomplished could be summarized thus:

The underpinning and side-walls on both sides of Park Avenue south of 57th Street, and the grading between them, had been finished sufficiently to permit the laying of four additional tracks, making eight in all, at the exit of the yard. The major portion of "Bite No. 1" on the easterly side of the terminal area along Lexington Avenue from 50th Street to 43rd Street had been completed with its yard, substation, heating plant, express facilities, street viaducts, drainage sewer to the East River, and a temporary passenger station – all in actual use by the New York Central's electrified suburban service. With this had gone the demolition of approximately 200 buildings – a veritable slum clearance – including time-worn and smoke-stained churches, hospitals, and stores. The Annex had been demolished and excavation was in active

**Evidently, the firm also received a lion's share of the architectural fees, for Reed and Stem sued the railroad on this issue after Stem's death and were awarded nearly \$400,000 by the courts.*

progress down to the lower suburban level beneath Depew Place and north of it, and the terminal building was nearly completed on Lexington Avenue between 44th and 45th Streets. The entire yard, old and new, had been electrified. . .²²

Changes continued long after excavation and construction had been begun. Additional land had been purchased to make possible a two-level loop around the head of the platforms, eliminating the need for "backing out" many trains. Tracks and platforms were increased, station facilities altered and enlarged. On February 2, 1913, the Terminal was formally opened to the public.

Although the completed building consists of hundreds of different specialized facilities at many levels of its complex plan, its central feature — a system of public spaces for handling incoming and departing passengers — was and still is a model of coherence and clarity. This clarity had both its formal and its functional aspects. In a florid statement at the time of the opening, Whitney Warren (by now *the* architect of the Terminal) employed an analogy popular with "City Beautiful" planners:

Modern cities have no portals or arches of triumph. Their real gateways are the railroad stations, and the motive of the facade of this terminal is an attempt to offer a tribute to commerce. The monumental group decorating the three great portals depicts the glory of commerce, typified by Mercury, supported by moral and mental energy — Hercules and Minerva.²³

But "gateway" is a totally inadequate term, suggesting a passive orifice under the open sky whereas the Terminal must be seen as a mechanism, a great reciprocating engine for pumping a huge flow of pedestrian traffic through a whole series of valves and conduits into connecting systems — trains, subways, taxis, trolleys and elevated trains.

The final design makes the station appear to rest on the podium of a bifurcated Park Avenue (Fig. 13). But the three great portals to which Warren refers are, in fact, not portals at all. They serve only to light the waiting room. They are only visible to pedestrians or automobilists approaching from the south. They are almost completely concealed by the podium from the view of the thousands of passengers who enter or leave through street-level or subterranean levels of little or no monumentality.

In actual fact, the enormous impact of the Terminal, especially upon arriving passengers, was due to a feature only suggested by the exterior: the Main Concourse (Fig. 14). This great chamber, 120 by 375 feet, with a vault 125 feet high at its apex, was one of the noblest in America — surpassed only by the great glass and metal vaults of the now-vanished Pennsylvania Station. Sheathed in marble and simulated Caen stone, its elliptical vault colored cerulean with constellations painted by Paul Helleu, the Concourse was dramatically illuminated by the great windows at

each end and the clerestory lunettes along each side. With the great sonorous echoes of the train announcers — so exciting for travellers to hear and so difficult for them to understand — this Concourse became the very symbol of the excitement of travel for generations of Americans.

The visual splendor of this chamber and its ancillaries — the waiting room, the lower Concourse with its famous Oyster Bar, the mezzanine balconies and the vaulted Grand Central Art Galleries — was fully matched by unprecedented amenities and conveniences. Long before its opening, the architectural and urbanistic significance of these had been noted by the *Town Planning Review* of Liverpool. Hailing it as "the greatest railway terminal in the world," the *Review* stressed its circulatory role in the life of the city:

The essence of the idea. . . is this: How to build a station so that John Smith or Mary Jones, who have never been in New York, can arrive at the Grand Central Terminal and pass through it to where he or she is going with the least possible confusion and the utmost tranquility and peace of mind.²⁴

This transition raised subtle experiential problems, especially for long-distance travellers, which the architects seemed to have considered with remarkable acuity. These incoming travellers would have been confined for many hours to small, snug (and, in the case of Pullman passengers, luxurious) spaces. In the earlier station, they would have been dumped into the cavernous train shed — noisy, drafty and smoke-filled — and thoroughly disoriented by the noise and movement. But now, the *Review* points out, trains would slip quietly into separate docks, with platforms at the same levels as car floors, low-ceiled, well-lighted and gently ramped (Figs. 15, 18). When passengers

end their journey at the new Grand Central Terminal, they will hardly mark the transition from the elegance of their temporary home on wheels. It will be like passing from one handsome apartment into the great corridor of another.²⁵

Thence marble-lined corridors, well-lit and weather-proof, gave access to taxi platforms, to surrounding streets and to two of the city's most elegant new hotels, the Commodore and the Biltmore.*

Commuters from the wealthy suburbs enjoyed comparable amenities: a separate, lower-level concourse with its own ticket windows, information booth, waiting room and toilets, as well as convenient underground passages to nearby office buildings, the subway down to Wall Street and cross-town surface

*The first was named for the founder of the New York Central, the second for the great chateau which Richard Morris Hunt had designed for him in the mountains of North Carolina. The two words became the very synonym for chic.

trolleys (Fig. 17). The new complex apparently still provided for a "steerage class":

These can be brought into the station and enter a separate room without coming into contact with other travellers. Special attendants will be detailed to them.²⁶

Stylistically, the Grand Central Terminal was notable for its consistency and — considering the idiom it employs — remarkable for its sobriety and simplicity. The idiom was that of the Ecole des Beaux Arts in Paris and was characterized by rationality in plan but flamboyance in elevation and ornament. Whitney Warren, who had studied there for the decade 1884-1894, obviously brought this experience to bear on the final form of the Terminal; but while the plan is clearly Beaux Arts in origin, the elevations show the style's exuberance only in such details as the sculptural group around the great clock on the south front.

Structurally, the complex is conventional. Such below-grade features as the tunnels, footings, foundations for future skyscrapers and ramped platforms display first-rate expertise in their engineering; and, of course, the ingenuity involved in carrying through the construction while maintaining service for 21,000,000 travellers a year was phenomenal.²⁷ But the above-grade structure employed a steel frame unexceptionable for its day (the Pennsylvania Station concourse was far more spectacular, if only because the steel frame was exposed to view.) Perhaps the most advanced structural elements in the whole complex were the series of thin shallow terra cotta vaults erected in the below-grade Oyster Bar by Raphael Guastavino.* Externally, this frame was sheathed with granite at street level and with limestone above. Internally, the surfaces were blond marbles, Caen stone (simulated), travertine and painted plaster — all in all, a pleasant unobtrusive polychromy offset by bronze sash and bronze and gilt chandeliers.

In terms of mechanical systems, the Terminal had some remarkably advanced features. With most of its public spaces either totally enclosed or totally below ground, the designers faced unprecedented problems in environmental control. As we have seen, electric traction had made the whole scheme possible by eliminating smoke, gases, and fire. But serious problems of heating and ventilation had to be solved. (Although summer air-conditioning would be considered mandatory today, it was not technically feasible then.) A totally new scale of electric lighting was called for, while the sheer scale of the complex demanded the application of electricity to other equipment. Thus the Terminal showed a wide and imagina-

tive use of new communication devices: elevators to move passengers and freight pneumatic tubes to circulate tickets and baggage checks, and what was regarded as the most advanced electric signalling system in the world. All such problems, and many like them, were solved at a level so high in 1914 as to remain acceptable more than half a century later.

The viability of the Terminal as a fundamental circulatory organ of the city has long ago been established. Between 1906 and 1930, commuter traffic on the Hudson and Harlem lines increased fourfold, from approximately 6,500 to 26,000 passengers per day.²⁸ Today, these lines handle about 30,000 commuters daily.²⁹ While long distance traffic has declined sharply, the Terminal today handles over 500,000 persons a day, many of them pedestrians using the all-weather passages which criss-cross the area. The benign impact of this traffic upon the district is attested by every index of urban growth, including the erection in the vicinity of dozens of important buildings. The Grand Central Palace, for many years the city's largest exhibition hall, was completed in 1913. The Biltmore Hotel was opened in 1914, the Commodore in 1919. By that time, too, many other important institutions had moved to the neighborhood: the Yale Club, the Raquet and Tennis Club, the Vanderbilt Concourse Offices.³⁰ The New York Central Office Tower, astride Park Avenue between 45th and 46th Streets, was begun in 1928 while the Bowery Savings Bank skyscraper had already been completed by 1923.

The most spectacular result of the new terminal project was, exactly as Wilgus had seen, the emergence of Park Avenue as the most prestigious residential district in the nation. In covering over its trackage between 42nd and 52nd Streets, the railroad had returned a great deal of prime land to the tax rolls and recouped a large part of its investment. By the late Twenties, all available air rights had been taken over by apartments and hotels. Further north, the same activity by private individuals had carried luxury apartments and large town houses up both sides of the Avenue to 96th Street, where it dropped off into Harlem.

This growth was reflected in other norms as well. Assessed valuation in the rectangle bounded by 41st and 58th Streets and Madison and Lexington Avenues increased by 244% between 1904 and 1926; the average for Manhattan as a whole was 26.5%.³¹ Between 1914 and 1930, land values along Park Avenue increased by over 200%.³² Probably because of the Depression, certainly because of World War II, activity in the area levelled off. But since 1945, Park Avenue both south and north of Grand Central has seen an extraordinary new phase of development in which the earlier apartments and hotels have given way to high rise office buildings. And the impact of this growth has been reflected along the East-West axis as well. The Chrysler Building (1930), the Daily

*The remarkable work of this Catalonian family of craftsmen, widely employed by leading architects during the first two decades of the century, has received its first critical appraisal in George R. Collins' paper, "The Transfer of Thin Masonry Vaulting from Spain to America," *Journal of the Society of Architectural Historians*, Vol. 27 (October, 1968), pp. 176-201.

News Building (1930), and Tudor City (1927-1932) had already extended the effective limits of the district towards the East before World War II. Since then, a whole constellation of important buildings — the Socony Mobil at Lexington (1955), the Ford Foundation at First Avenue (1967) and the United Nations complex on the East River (1948-1961) — have consolidated this system.

The Grand Central Terminal can thus, with justice, be described as the generator of a vast concentration of new urban development. But, for almost fifty years, the Terminal itself remained relatively undisturbed, a low sculptural mass in the roofless bowl created by all its towering offspring. It was perhaps inevitable that, sooner or later, it would occur to the New York Central management that, having created the enormous inflation of realty values in the surrounding land, it might begin to skim off some of the increment itself. Certainly, the drop in passenger revenues since World War II would, alone, have led them to re-examine the potentials of their own realty holdings. Thus was set in motion a series of proposals for developing the air rights over the Terminal and its ancillaries — a trend which is still continuing today.

The first proposal, for an eighty-story tower over the low annex immediately to the north of the Concourse itself, was advanced by William Zeckendorf in 1954.³³ This was followed by a similar scheme from the architectural firm of Felheimer and Wagner, successors to the original firm of Reed and Stem.³⁴ Both schemes fell through but the one which was ultimately to result in the 59-story Pan Am Building was launched by the real estate operator Erwin Wolfson in 1958.³⁵ Whatever the motivation of these schemes, and however justified they might have seemed to the management, they inevitably involved the erosion of the esthetic and urbanistic assumptions of the original design. And they inevitably led to strong opposition from many quarters. Their arguments against permitting the erection of any tower at that point were of two sorts.

One set of arguments had to do with the visual damage which such a tower would do to the Terminal and its environs, especially to the Park Avenue streetscape, by its *sheer presence*. (That the argument had basis is clear from a comparison of Figs. 13 and 20.) Another set of arguments was levelled at the first published designs, whose unabashed mediocrity was so apparent that the architects, Emery and Richard Roth, quickly withdrew them. They then called upon two of the country's most prestigious architects, Walter Gropius and Pietro Belluschi, to redesign the tower.³⁶ This was done; and the design which emerged from their drafting rooms was less mediocre, esthetically, and perhaps somewhat more satisfactory functionally, than its predecessor. But it did not really meet the fundamental objection — i.e., that *any* tower in that particular spot would do esthetic violence to the existing ensemble.

Nor could it meet the other, urbanistic objection — i.e., that such a building with its 17,000 regular tenants and estimated 250,000 daily visitors would place an intolerable strain upon the facilities of the already over-loaded district. But the opposition lost. The Pan Am Building (as it was subsequently named) was built (Fig. 20). And, while the predicted new strains have indeed appeared, they have perhaps not proved to be as disastrous as the opponents had predicted. This in itself was a tribute to the Terminal's built-in capacity to receive, sort out and then dispatch a large number of pedestrians following a network of trajectories.

The next assault on the noble spaces of Grand Central occurred in 1960, when a scheme was unveiled to subdivide the main Waiting Room horizontally into four fifteen foot stories, the upper three to be occupied by bowling alleys! A scheme at once so venal and frivolous could not survive the storm of protest it provoked.* It was quietly dropped.³⁷

The last and most recent attack on the *plein aire* of the Terminal was launched on June 20, 1968, when the famous Hungarian-born architect Marcel Breuer unveiled his plans to build a 54-story tower directly over the Waiting Room. In many ways the strategy of the promoter, English-born Morris Saady, was quite adroit. In selecting an architect of Breuer's proven ability, he side-stepped any possible accusation of being satisfied with a conventionally vulgar skyscraper. And Breuer's tower, of substantially the same shape and volume as the Pan Am to the north of it, could scarcely be accused of doing serious damage to a skyline already pre-empted by Pan Am. Breuer's design also side-stepped another explosive issue by leaving the Concourse untouched. In fact, that great hall was to be restored to its original state:

Mr. Breuer made it clear that the clutter of advertising signs, photo displays, commercial exhibits and the like will be banished.³⁸

In the Breuer scheme, the Waiting Room was to be converted into the lobby of the new tower, though presumably retaining its 85 foot high vaulted ceiling.

The Breuer scheme had several architectural merits and two insuperable urbanistic drawbacks. It proposed to preserve the volumetric character (if not the original function) of the Waiting Room; it proposed to refurbish the entire first floor facade along Vanderbilt Avenue and 42nd Street — a facade which is actually the pedestrian's most important contact with the building; and it proposed to return the great Concourse to approximately its pristine state (only the South Mezzanine would have disappeared).

But the negative aspects of the proposed alteration are profound and are ambivalent in nature. The new tower threatened to fill almost completely the re-

*This grotesque proposal undoubtedly expedited the subsequent designation of Grand Central Terminal as a Landmark by the Landmarks Preservation Commission of New York City. The Commission itself had been created by N.Y.C. Local Law #46, dated April 19, 1965.

maining sky-space which has been one of the chief urbanistic assets of the open vessel effect. The most serious danger was that the already heavily-loaded transportation system would collapse under the added load. For although the Terminal complex has demonstrated repeatedly its ability to handle larger and larger crowds, it must — like any machine — have an absolute upper limit of capacity. Perhaps if the whole subsurface system of rail and subway lines, and the network of connecting passages serving it were rescued from obscene obsolescence and neglect, then the already overloaded surface traffic could be held within tolerable limits. But, exactly as in the case of the Pan Am Building, such measures lie almost wholly outside the control or responsibility of the new tower. There is, as a consequence, no guarantee whatever that the environmental impact of the new tower would not be disastrous.

The application for permission to erect the tower atop the Terminal was heard before the Landmarks Commission on July 18, 1968. The proposal, which had already been widely criticized in the press, was vigorously opposed by many civic and professional groups. ("It's the wrong building, in the wrong place, at the wrong time," said Donald Elliott, Chairman of the City Planning Commission.)³⁹ The application for a certificate of acceptability was denied by the Commission on September 20, 1968, in a letter to the sponsors from Chairman Geoffry Platt, who said that the proposed design "did not meet the requirements for a Certificate of No Exterior Effect."

On April 10, 1969, the Penn Central Company appeared again before a hearing of the Landmarks Commission, with an alternative proposal from the office of architect Marcel Breuer. This time — presumably in response to the Commission's earlier finding that placing a 55-story tower atop it would have a negative effect on the old Beaux Arts pavilion — the new scheme moved the tower south so that the Landmark disappeared completely in its base. Thus did the promoters answer the commission finding of "incongruity"! However, in this second scheme they did agree to the complete restoration of the whole Concourse ensemble and to guarantee its maintenance in perpetuity. It could be argued (as indeed it was) that the restoration of this great vessel would mean more to the tens of thousands who used it daily than would the preservation of its exterior surfaces. But (as was also pointed out at the hearing) neither the restoration of the Concourse nor the preservation of the exterior was in any logical sense dependent upon there being a new tower on top of the Terminal.

On September 20, 1969, the Landmarks Commission voted not to grant the "certificate of appropriateness" necessary to carry out this second scheme. The Penn Central Company and the developers appealed this finding to the State Supreme Court which has not handed down its decision as this monograph is being completed. Whatever the decision

however, the struggle to preserve the Grand Central Terminal in its present form is a classic demonstration of the problems of preservation in central business districts.*

Rockefeller Center

Construction of Rockefeller Center actually started in February, 1932. But the first steps toward the urbanized use of the site had begun more than a century and a quarter before, when Dr. David Hosack converted open farm lands into one of the first public botanic gardens in the New World. It is perhaps nothing more than an accident of history that Rockefeller Center would ultimately become "the first landscaped skyscraper" in history⁴⁰ or that the plaza itself was to become celebrated for its botanical displays, visited by thousands of tourists at Easter, Christmas, Thanksgiving, and other holidays. David Hosack (1769-1835) was a professor of botany and *materia medica* at Columbia College when he was granted twenty acres of land by New York City for the establishment of a "public botanic garden."⁴¹ The tract extended along Fifth Avenue from 47th to 51st Streets and ran westward to within 100 feet of what is now the Avenue of the Americas.⁴² The deed was executed on August 6, 1804.⁴³

Named the Elgin Botanic Gardens (after his father's birthplace in Scotland), the new establishment already claimed by 1806 to include specimens of "the greater part of the useful plants and trees which grow in the United States."⁴⁴ The emphasis was apparently utilitarian from the very start. An 1807 advertisement stressed the fact that the garden was "not only useful as a source of instruction to the students of medicine but also beneficial to the public by the cultivation of those plants useful in diseases, by the introduction of foreign grasses and by the cultivation of the best vegetables for our tables."⁴⁵

By 1811 the Elgin Garden also boasted a quite sophisticated structure for growing and exhibiting exocytic plant materials (Fig. 21):

Since that time [1801], an extensive conservatory, for the more hardy green house plants, and two spacious hot houses, for the preservation of those which require a greater degree of heat, the whole exhibiting a front of one hundred and eighty feet, have been erected, and which, experience has shown, are well calculated for the purpose for which they were designed. The whole establishment is surrounded by a belt of forest trees and shrubs, both native and exotic, and these again are enclosed by a stone wall, two and a half feet in thickness, and seven feet in height.⁴⁶

However, the project apparently proved too burdensome for Hosack from the start. In 1805 he had al-

*The plaintiffs are bringing suit to have the Landmarks law found unconstitutional and to receive compensation for what they claim to be economic hardship resulting from unearned revenue on the terminal property.

ready petitioned the State Legislature for aid, but it adjourned without acting on his bill. Hosack persisted, however, and finally, on March 12, 1810, the Legislature passed "An Act for Promoting Medicinal Science in the State of New York." The State agreed to purchase the garden (it was then valued at \$74,268.75) for the benefit of the medical schools in the state. Four years later the gardens were ceded to Columbia College, on the condition that the College itself be established on the site or near it within twelve years. Columbia never met this condition, which was repealed in 1819, but the act marked the University's emergence as a major landlord of the entire area occupied today by Rockefeller Center.

As to the Garden itself, its disappearance was inevitable. The glass houses apparently survived for decades. But a more intensive use of the land on which they stood was already forecast by the Commissioners' Map of 1811 which foreordained a gridiron street pattern for the entire island (Fig. 2). The erection of the ill-fated Crystal Palace (1852) showed that the urban tide was already lapping at the southern periphery of the site. In August, 1855, intense activity was reported in what was called "the upper part of the City": 47th Street had been pushed west to Sixth Avenue, 49th and 53rd Streets were being extended eastward from Seventh Avenue.⁴⁷ In May, 1856, Sixth Avenue was scheduled to be "graded as far [north] as 49th Street in a few months."⁴⁸ As a consequence many buildings were being erected between 47th and 51st Streets — "the selection of the site for Central Park. . .having given an impetus to the work."⁴⁹

And yet the appearance of the whole district during the Fifties must have been chaotic. In what was to prove to be a remarkably prescient move, the Roman Catholic Church had begun construction of the white marble design by James Renwick in 1859.⁵⁰ But opposite it, a year later, there was only one small wooden building.⁵¹ Except for four brick row houses below 49th Street, the area was largely undeveloped. A photograph of that year shows the house on the south side of West 54th Street that was later purchased by John D. Rockefeller, the beginning of a century-long association of the family with the site (Fig. 22). Beyond its tidily walled garden stretches a wasteland of treeless, graded building lots. Just at this time a Dr. Thomas Ward had built a house at Fifth Avenue and 47th Streets; the papers called it a "palace in the wilderness."⁵²

A few blocks to the east conditions seemed to have been even worse. There were many poor squatters' shacks in the area lacking all sanitary facilities. In the Potters' Field near Park Avenue and 50th Street, the indefatigable diarist George Templeton Strong reported that paupers' bodies were "gnawed and crunched by the gaunt swine that are co-tenants with Hibernian humanity of the adjoining shanties."⁵³ And further east were the railroads, with their noise, smoke and danger.

Yet all this was to change with startling rapidity. In a decade or so, the entire section was to become and remain a center of fashionable residential and commercial activity.

Undoubtedly, the policies of Columbia University played a role in this development. Even the final appearance of Rockefeller Center was facilitated by the fact that the land was in single ownership. It began a policy of long-term leases in 1859, interrupted only when it sold two portions of the tract to meet expenses — the block between 47th and 48th Streets and the eastern end of the block between 48th and 49th Streets.⁵⁴ Perhaps because of the Civil War, leasing was slow until 1865 after which time it became more active.⁵⁵ By 1872 there were two hundred "costly" buildings under way in the rectangle enclosed by 42nd and 59th Streets between Madison and Sixth Avenues.⁵⁶ An 1879 map indicates that every lot of the Columbia property was built upon by that date.⁵⁷ The houses were upper-class versions of the three- and four-story row houses which had been popular for a century. In order to establish and maintain the district as a fashionable residential area, Columbia prohibited lessees from erecting "French flats" (as apartment houses were then known) or any commercial or industrial buildings.⁵⁸

This restrictive policy was made possible by improved mass transit connections with downtown. A steam-powered elevated railroad was extended up Sixth Avenue to 59th Street in 1878; and shortly thereafter a comparable line connected the Grand Central Depot with the Battery. The same policy made it possible to keep commercial and service activities out of, and yet accessible to, the great residential establishments which were being built along Fifth and Madison Avenues. The former, because it was the only one with asphalt paving (cleaner and quieter than cobbles or brick) and because it was free of horsecars and elevated railroads, became the main carriage and promenade route* to Central Park⁵⁹ (Fig. 23).

For a couple of glittering decades, the area remained the very center of American wealth and fashion. Along Fifth Avenue, between 47th and 51st Streets, financiers like Jay Gould, Robert Goulet, and D.O. Mills had established big houses. John D. Rockefeller had bought a house on 54th Street near Fifth Avenue (Fig. 22). William Kissam Vanderbilt, whose first Grand Central Depot stood only a few blocks away, at 42nd Street and Fourth Avenue, had the architect Richard Morris Hunt design a great house for the corner of Fifth Avenue and 52nd Street (1881). Only a few blocks away, on Madison Avenue, the Villard family had built in 1885 an imposing group of houses designed by McKim, Meade and

*The custom of promenading along Fifth Avenue in the upper Fifties survives today in the "Easter Parade"; it has been mightily reinforced by the proximity of St. Patrick's Cathedral and Rockefeller Center which creates something very near to the Italian piazza del Duomo.

White; a little way up Fifth Avenue at 58th Street, George B. Post had designed a town house for the Cornelius Vanderbilts. Later, in 1891 still further up Fifth Avenue, the Elbridge Gerrys and John Jacob Astors began construction on houses by Richard Morris Hunt. And around such bigwigs, on the cross streets, lived many wealthy doctors, lawyers and other professional men.⁶⁰

But already during the mid-1890's Fifth Avenue below 52nd Street began to lose its residential character as business activity pushed relentlessly northward. Contemporary reports record the change. In December, 1893, said one account, "below Forty-second St. there is hardly a house for sale or lease that does not have a clause in the notice that the property will be altered for business purposes."⁶¹

In 1898 a writer noted that

Between 23rd and 42nd, or rather, perhaps, 59th Street, in the centrally located avenues, the typical three and four-story private dwellings are rapidly being displaced by taller structures of a semi-public nature — store and office buildings, studios, hotels, theatres, clubs, and high-class apartment houses. During the last administration large sums of money were expended on public improvements in this central district — 14th to 59th street — particularly in Fifth Avenue.⁶²

Between 1909 and 1914 the residential character of Fifth Avenue was further diminished when it was widened by 15 feet between 13th and 58th Streets, removing trees and front gardens in the process. And by 1915, the fundamental change in land use was very evident:

The Avenue from 23rd to 34th Streets is mainly devoted to retail specialty shops, while from 34th to 59th Streets, department stores and exclusive shops now predominate, having swept away or flowed around churches, clubs, hotels and residences.⁶³

As the principal landlord in the area, Columbia University was to accelerate the change by altering its leasing policies to permit non-residential uses. As a result, many brownstones, especially along the cross-town streets, were converted into multi-family usage with shops along the ground floors (Fig. 24). Along Fifth Avenue proper the change was slower, some residential character surviving until 1918. But even before the end of the century, as we have seen, the center of gravity of the most fashionable residential area had moved north along Fifth Avenue across from Central Park.

The neighborhood retained its fashionable character, however. Specialty shops and art galleries infiltrated the old residences. The University Club built a Florentine palace on the northwest corner of Fifth Avenue and 54th Street in 1899. Two luxury hotels, the St. Regis and the Gotham, facing each other at 55th Street, arose between 1901 and 1905. And one

of the richest Protestant congregations in the city built St. Thomas' Church in 1909-1914. Thus deterioration, the historic corollary of urban expansion in Manhattan, did not appear in this area; and the answer almost certainly lay in the stabilizing effect of the other two great mid-island projects — Central Park to the north and the Grand Central-Park Avenue complex to the east.

Unlike either Central Park or Grand Central, however, the complex now known as Rockefeller Center went through a series of quite radical alterations between initial concept and final form. Even the association with the Rockefeller family developed slowly, almost accidentally, despite the family's long association with the site. In fact, the only physical feature which has remained constant from the start was the concept of a traffic-free, inward-turning plaza midway between Fifth and Sixth Avenues. (This, as we shall see, was absolutely central to its success.)

The story of the Center begins in 1926 with the search of the Metropolitan Opera Company for more modern and more adequate facilities than those offered by its old home at Broadway and 40th Street. The Metropolitan's search for a new home was to take exactly four decades and was to end in the creation of another complex of somewhat similar character, Lincoln Center. Three sites had already been explored — 57th Street between Eighth and Ninth Avenues, Columbus Circle, and 63rd Street and Broadway — almost precisely where, ironically, it was finally to be located.⁶⁴ Otto Kahn, the millionaire patron of the opera, had appointed Benjamin Wistar Morris as architect and Joseph Urban, the Viennese emigré as associate. They designed three projects, one for each of these sites, two of which featured a centralized plaza. All of these were rejected by the opera company, presumably because the opera house itself was made smaller to make way for income-producing buildings around it.

In January, 1928, the three-block Columbia property first appeared as a possible site.* In May of that year, Morris prepared a scheme for the site which included most of the significant features of the final design (Fig. 25) — a land-use mix of theatrical, shopping and office facilities; a centralized, traffic-free plaza; and a combination of low and high-rise buildings.

In presenting his new scheme to its sponsors (a group which included John D. Rockefeller, Jr.), Morris insisted that the validity of his new scheme was economic, not merely aesthetic: "the whole thing stands or falls on the amount of increased revenue obtainable due to the creation of valuable new frontage on an open square."⁶⁵ Thus Morris must be credited as having been the first to visualize the new

*The person who first proposed this specific site was reportedly John L. Tonnele, of the real estate management firm of William A. White and Sons, a company already employed by the Rockefellers.

center in both its fundamental physical and socio-economic functions, as Winston Weisman has convincingly demonstrated.⁶⁶ But, whatever his prestige, Morris gradually disappears as a principal from the roster of architects associated with the project. As is often the case, when construction of this magnitude and prestige is involved, it is not easy to trace the exact sequence of design events. In the late summer of 1928, two young architects, L. Andrew Reinhard and Henry Hofmeister, drew up a plan of the site for Rockefeller Center. In this scheme (Fig. 26) the opera house and plaza are still Morris's, but the rest of the plaza is now surrounded by hotel and office buildings, with a department store and apartment buildings around the periphery. A subterranean level for automobile and truck traffic now appears for the first time. Since the property along the western edge of the tract was not yet under Columbia University control, it was excluded from this proposal.

In December, 1928, the formation of the Metropolitan Square Corporation was publicly announced, and an Architect's Programme Committee, which consisted of John Russell Pope, Charles Platt, and Milton Medary, Jr., was formed. Headed by Rockefeller, the Corporation was to handle the planning for the property except for the opera company area. On January 22, 1929, the Corporation signed a lease with Columbia University. In February, the Corporation announced the formation of an Advisory Board of Architects, composed of the members of the Architect's Programme Committee and William T. Aldrich, B.W. Morris, Edward Bennett, H.W. Corbett, Cass Gilbert (who replaced Charles Platt) and the principals of Cross and Cross and of York and Sawyer.⁶⁷ The members were instructed to submit plans which were to "provide a site for the Metropolitan Opera House, and to assure appropriate and artistic environment, ample and convenient approaches, circulation, and a dignity and harmony of architectural composition in the development of the land surrounding the Opera."⁶⁸

Evidently none of the designs submitted was considered satisfactory, for in the following October the Todd, Robertson, Todd Engineering Corporation and Todd and Brown, Inc., were named as managers of the project. Four weeks later Reinhard and Hofmeister were named as architects with Harvey Wiley Corbett, Benjamin Wistar Morris, and Raymond Hood as consultants. Reinhard and Hofmeister submitted their first design for the site at the end of November (Fig. 27).

The disaster of the October Wall Street crash and the ensuing Depression intervened. Early in December negotiations with the opera company were discontinued. But since the lease had already been signed, Rockefeller was still responsible for the yearly rental to Columbia. The terms of the lease called for an initial rental period of twenty-four years with the

option of three renewals, each for twenty-one years to the year 2015, after which time both the buildings and the land would revert to Columbia. (In 1953 the renewal options were extended to the year 2059). While Columbia's yearly income from the brownstones on the property had amounted to only \$300,000, the yearly rental for the Metropolitan Square Corporation was fixed at \$3,300,000. Today the University receives almost \$4,000,000 in annual rental from the Center.

In 1929 Rockefeller's choice was to suffer a large financial loss with the existing buildings or to build on the site. He decided to build. On December 6, the Metropolitan Square Corporation notified its architects that their plans should from now on "be based upon a commercial center as beautiful as possible consistent with the maximum income that could be developed."⁶⁹ Thus "Rockefeller Center was built because an opera house was not."⁷⁰

In January, 1930, a design called "G-3" was drawn up by Reinhard and Hofmeister and was submitted to the Board of Directors of the Corporation in February (Fig. 28). Now that the opera house had been eliminated, the tower building formerly located along Fifth Avenue could be moved westward to the former site of the opera house and lower buildings put in its place, thus enhancing the plaza and its relationship to Fifth Avenue and St. Patrick's Cathedral, as well as circulation within the grouping. Plan G-3 also proposed a thirty-story office building and a nineteen-story loft building at the northeast corner of the site. Except for these two latter aspects, this plan was similar to the November, 1929, plan and is quite similar to the core of Rockefeller Center as it appears today (Fig. 29).

The planning for the Center continued during 1930. The next stage produced a series of schemes termed the "H plans." In these a building whose form varied at times from elliptical to pyramidal was suggested for the central plot facing Fifth Avenue. Bridge buildings, to provide additional revenue, featured rooftop landscaping for the first time — a device ultimately used atop the four low buildings along Fifth Avenue. While these aspects of the design were later abandoned, the "H plans" did make some important contributions to the final appearance of the Center by determining the forms of the RCA Building and the combined RKO Building and Music Hall.⁷¹ During this period, a plot west of the RCA Building was acquired and the RCA Building West was planned.

In June, 1930, an agreement was signed with the major tenant of the tower building, the Radio Corporation of America. RCA also agreed to rent four theaters (later reduced to two) and another office building, and NBC was given exclusive broadcasting rights in the Center. In July the term "Radio City" was coined and was for several years used informally as the name of the whole complex. (It referred primarily

to those buildings on the western side of the Center: the RCA Building; the RCA Building West; the RKO Building, now the American Metal Climax Building; Radio City Music Hall; and the Center Theatre, which was demolished to make way for the United States Rubber Company Addition in 1954). Demolition on the western portion of the site was begun in the spring of 1930, and excavation was begun in July, 1931. The formal lease with RCA was signed in October, 1931, and construction of the four structures was started at various times between September, 1931, and January, 1932 (Fig. 30).

Meanwhile, an association of architects had been formed. After the end of May, 1930, and beginning with the "H plans," drawings were signed by the following groups: Reinhard and Hofmeister; Corbett, Harrison and MacMurray; Raymond Hood, Godley and Fouilloux.⁷² These additional members were, according to one source, brought in "because of the contractual obligations of the other men already involved."⁷³ It is this associated group that is commonly named as architects for the Center,* but those who worked on the initial planning played an especially influential role in the basic form of the complex.

In 1932 two important features of the Center were established. Until then the project had been officially called Metropolitan Square, but in April, Rockefeller was finally persuaded to lend his name to the complex. It was during this period that the buildings known as the International Group located along Fifth Avenue were created. Agreements were reached with French and English interests for the two low buildings to be called the British Empire Building and La Maison Francaise. Construction of these buildings began in February, 1932.

Construction of Rockefeller Center continued throughout the depths of the Depression. By September, 1933, the following structures had been opened: the RCA and RKO Buildings, the enormous Radio City Music Hall and the smaller, more elegant Center Theatre, the British Empire Building, and La Maison Francaise. The rest of the Fifth Avenue frontage was completed, after several changes in design, in the form of a recessed 41-story skyscraper called the International Building, flanked by two more low structures matching the English and French buildings. These, leased to German and Italian interests, were to be called Palazzo d'Italia and Das Deutches Haus. Construction began in July, 1933 — a few short months before the seizure of power by Hitler — and the buildings were opened in May, 1935. This political development cast an ugly shadow across the north pavilion. In the face of mounting criticism and un-

*Morris' name as a designer seems to disappear at this juncture, though he lived until 1944. Raymond Hood had died in 1934. Otherwise, the associated architects remained as designers of the Center buildings though, according to Weisman, the firm of Corbett and MacMurray does not seem to have been involved in the design of the Associated Press, Eastern Airlines, and U.S. Rubber Company Buildings.

favorable publicity, the designation Deutches Haus was first played down and then quietly dropped. The four buildings have since been known as the International Group (Fig. 31).

Work on the Center proceeded steadily all through the 1930's and was substantially completed by 1939 — only a few months after the outbreak of World War II. The 36-story Time-Life Building (now known as General Dynamics) arose on the Plaza between 48th and 49th Streets. The Associated Press Building was completed in 1938, the Eastern Airlines Building in 1939. It was on the occasion of driving the last rivet into the skeleton of the U.S. Rubber Company Building in November, 1939, that John D. Rockefeller declared the Center officially "completed." In the decades since World War II, Center activities have extended far beyond the confines of the original tract; but, for a time, it looked as if these extensions were to be more corporate than physical. Fortunately, this has not proved to be the case: in response to public criticism the circulation plan of the expanded Center has been thoroughly restudied. As a result, the system of concourses, when completed, will offer underground connections from the old IND Subway mezzanine to a new north-south spline which will serve the new towers located between the Celanese Building at the corner of 47th Street and the Avenue of the Americas to the J.C. Penney Building at 53rd Street (Figs. 34, 37).

If all the norms of urban viability — rising tax assessments, high occupancy ratios, prestigious tenants, maximal rental rates, etc. — are any index, then Rockefeller Center must be rated as a highly successful enterprise for its principals. But these are, so to say, internal indices; what is significant about the Center externally has been its benign influences on the entire midtown district of Manhattan. It has not only demonstrably raised the whole tone of this area: *it has also held it there for thirty years.*

It is not easy to isolate the specific causes of growth and decline in any architectural entity; and, in the case of the Center, they seem especially complex. A central factor in the Center's success was, of course, its prime location. It was placed athwart an east-west cross-town axis connecting the Grand Central Terminal with the Times Square entertainment area — in the decade in which the Center was conceived there were some forty-three legitimate theaters between 42nd and 47th streets. The Center faced on the city's greatest avenue, midway between two great stabilizers — Bryant Park and the Public Library on the south, Central Park on the north. But this description fits a large area — extending from 42nd to 59th streets and from Madison Avenue across to Broadway — and therefore fails to explain why other comparable projects did not develop alongside or instead of Rockefeller Center.

The second factor in the success of the Center was undoubtedly its adequate physical size and financial

backing. In urban development there is clearly some level, some "critical mass" below which a project cannot succeed in creating its own new fields of force. The original tract was large enough for this purpose; moreover, it was already assembled under a single monolithic ownership. The Center was also blessed with having behind it the immense resources of the Rockefeller interests which — in the fact of the worst economic disaster in American history — could push it forward to rapid conclusion. This time factor was important, too, since like any mechanism the Center could not begin to function effectively until it was largely complete.

But sheer size and adequate backing are only part of the explanation. (The Empire State Building — completed in 1931 — had both and has never exerted any comparable impact on its environs.) They may be an indispensable basis for success; but they neither *guarantee* success nor do they fully explain it. To discover this we must turn to an analysis of the actual physical configuration of the Center itself.

Like Grand Central, it has proved to be a reciprocating engine of enormous attractive power and huge capacity, satisfactorily handling some 160,000 pedestrians per day, moving along a bewildering range of above-grade and below-grade trajectories. The heart of the Grand Central engine is, as we have seen, the vaulted Concourse; the heart of the Center is the T-shaped plaza. The one is a covered vessel, the other open. The crowds who use the Grand Central Concourse and its network of underground passages do so for strictly "functional" reasons — i.e., they are compelled to use them as a transfer point for entering or leaving the mid-island area. On the other hand, the crowds who circulate through, around and under the Center plaza do so for "contrived" reasons — i.e., to participate in a range of activities invented and arbitrarily concentrated by a super-landlord. In the end, of course, such a distinction disappears. Because the management was correct in estimating the potential needs of the area, the Center's shops, restaurants, theaters and office buildings have become as functionally integral a part of the city as the Terminal.

It is apparent that both sponsors and architects understood this dialectic from the very start. As Morris had put it, the Center had to be economically viable before anything else. And this viability would be achieved only by a wide mix of uses and tenancy. Henry H. Deane, writing in 1931, saw that

the diverse nature of the proposed occupancy, the provisions for parking, the intercommunication between buildings — all these make it apparent that here is a project which is a thing apart from anything heretofore done.⁷⁴

Indeed the original proposals called for an even richer variety of use than was finally obtained; had apartment houses and hotels been included, the night-time use of the Center would have been greatly extended.

The lack of after-dinner pedestrian traffic in this area is its only serious deficiency — as it is for Fifth Avenue as a whole.*

In the final analysis, the success of the Center must be attributed to the T-shaped plaza — the landscaped mall between 49th and 50th Streets which leads down to the hollowed-out square of the plaza proper (Figs. 32, 36). An almost unique feature in the Manhattan city-scape, this is an authentically inward-turning centripetal space which is not violated by through wheeled traffic. Small and conventional as it might seem today, this space has been successful beyond the fondest expectations of its promoters. A leading urban designer, Edgardo Contini, has recently written, however, that the Channel Gardens (as the mall leading to Fifth Avenue is called)

is not really dedicated to people nor conceived for their movement or rest...in spite of its superb location and the high level of traffic that the Center generates, the plaza has never been a commercial success.⁷⁵

It is difficult to understand Contini's logic. If he refers to rental income from the shops along Channel Gardens or the profits of the wintertime skating rink, he may be correct — though one must assume that the Center management balances this against their over-all contribution to the project. By 1970 standards the plaza complex may indeed leave something to be desired. There is a shortage of seating, of summertime shade, of trash baskets, drinking fountains and public restrooms. But if one observes the crowds which flock to the annual Christmas tree in the plaza or to view the floral displays in the Channel Gardens at Easter (Dutch bulbs), mid-summer (tropical plants) or Thanksgiving (chrysanthemums), one can only rate them as sensationally successful generators of crowds. Which is exactly the way they have always been visualized. One has only to compare Rockefeller plaza to the landscaped plazas which surround many large office buildings — Lever House or Seagram's in midtown, Chase-Manhattan in the Wall Street district — to see the qualitative difference in performance.

The plaza, occupying the approximate center of the plot bounded by Fifth and Sixth Avenues and running from 48th to 51st Streets, is nourished by two levels of pedestrian paths, lobbies and concourses, one at street level and one below (Figs. 33, 34, 35). A feature of all the original Center buildings — unheard of then and uncommon even now — is that their lobbies are conceived of as lines of communication, not private cul-de-sacs leading only to the elevators and consequently used only by the building's tenants and its visitors. Moreover, instead of being monumental, tomb-like halls (like the contemporaneous Chrysler and Empire State towers) they were

*In recognition of this problem, the Center management has recently initiated a project which extends from the installation of new street and plaza lighting to revised programs at theatres aimed at attracting a new after-diner audience.

lined with shops which ordinarily ran from the lobby back to the sidewalk. Thus through traffic was made at once possible and attractive for pedestrians who otherwise might not have entered the Center at all.

At the lower level was a second system of pedestrian circulation — a one and one-half mile-long system of concourses which afford all-weather connection to all the buildings and are lined with shops and services (Fig. 36). The concourses also serve the cafes facing on the lower plaza (Fig. 35). They were connected in 1958 with the Sixth Avenue subway extension, which has been described as the only “humanly maintained” subway station in New York⁷⁶ and are currently being extended along the west side of Sixth Avenue as far south as 47th Street. The impact of the concourse system would probably have been even greater if it had been linked with that of the Grand Central Terminal as was once projected.⁷⁷

Beneath the lower plaza there are two large shipping rooms which are served by ten truck ramps and distribute freight throughout the original part of the Center. The six-story parking garage next to the Eastern Airlines Building was the first in New York to be integrated with an office building. Such factors make Rockefeller Center even today seem a refuge from many of the common city annoyances caused by vehicular traffic.

Unlike the functional organization of the Center as a whole, the architectural design of the individual buildings was not especially advanced. Their precise esthetic genealogy remains to be worked out; but they show very little evidence of having been influenced by the avant-garde architecture of Europe. LeCorbusier had already published (1925) his Voisin scheme for rebuilding central Paris as a great skyscraper-studded park⁷⁸; and designs by Walter Gropius and Mies van der Rohe for glass-walled skyscrapers were already widely published around the world. Such projects were almost certainly known to some of the eight principal architects to whom the design of the Center had been entrusted. Yet there is little evidence of trans-Atlantic irradiation — the exposed frames, cantilevers and completely transparent lobbies of which the great European modernists were so enamored.

Far from dramatizing the fact that the walls were only light membranes stretched around a supporting skeleton, the Center skyscrapers were designed to look as though they had loadbearing walls of Indiana limestone; indeed, the RCA and International towers look almost as though they were solid stone shafts, with little or no interior voids. They were thus very much in the main line of American skyscraper design between World War I and the Depression — differing only in that their massing was simpler and less sculptural and that they were almost completely free of the surface ornament which was efflorescing over most of their contemporaries. They were certainly far less advanced, stylistically, than the remarkable build-

ing which George Howe (1886-1955) and William Lescaze (1896-1969) had already completed in Philadelphia for the Philadelphia Saving Fund Society (Fig. 38).

Yet even these homely virtues have been enough to endow the Center buildings with a kind of stylistic timelessness. This durability is also physical: the sober limestone and stainless steel has proved cosmetically very resistant to the attrition of the New York climate. The result is that they — like the Daily News Building by one of the Center architects, Raymond Hood — seem far less dated than many much younger buildings.

This esthetic durability derives from still another fact — the volumetric organization of the individual buildings as free-standing towers rising sheer from the base. A commonplace in New York today, because the current building code permits increased height in proportion to decreased land coverage, it was a very novel feature in the late Twenties. At that time the code of 1916 was still in effect, requiring the building facade to step back from the street according to predetermined angles. This led to the “ziggurat” profile whose esthetic possibilities had been glorified by the architectural delineator Hugh Ferriss (Fig. 39). And in his May, 1928, design, Morris had employed this principle (Fig. 25). But it disappears in subsequent designs, never to reappear; even the latest Center skyscrapers have continued to follow the volumetric principle of a slender, almost completely unelaborated, shaft. The significance of this policy was well understood at the time as being

perhaps the first step toward a possible transformation of the city, in which extremely high buildings might go up without a break, provided they were entirely surrounded by a sufficient amount of open space.⁷⁹

Although a hardheaded insistence upon economic viability was a cornerstone of management policy, it did not lead — as it might well have — to simple penny-pinching. On the contrary, the management seems to have understood from the start that a certain portion of the initial capital investment would have to be charged off to launching the project as a whole. Thus the entire fabric was marked by a largesse of scale and sober richness of materials. This was especially evident in street level public spaces, whether outdoors or in; in the cafes around the skating rink; and in the Rainbow Room atop the RCA Building. (Most of all perhaps in the Music Hall Rockettes, the largest and most mechanically perfect of all the world’s choruses!)

Art was also a part of this policy of added attractions. It was, however, cautious and conservative from the start and acquisitions ceased altogether in the late Thirties. Two of the principal works — the gigantic *Atlas* by the academic sculptor Lee Lawrie and the gilded *Prometheus* by another academician, Paul Manship — have long been the subject of rather

good-natured ridicule for their platitudinous banality. Lawrie was also commissioned to design the great glass screen of the RCA lobby, while Isamu Noguchi was the author of the most advanced artwork in the Center – the cast stainless steel bas-relief over the entrance of the Associated Press Building.

But the most controversial art in the Center was the ill-fated mural in the lobby of the RCA Building by the great Mexican painter, Diego Rivera (1886-1957). A most improbable choice in retrospect, Rivera and the Center management clashed when, as the mural began to be executed at full scale, it revealed such controversial features as a portrait of Lenin and a passage dealing with the disastrous effects of poverty and disease. When Rivera refused to delete these passages, he was discharged and his mural destroyed. It was replaced by the monochromatic platitudes of a conservative Spanish artist, Jose Maria Sert (1876-1945).

Such features as these quickly made Rockefeller Center into a tourist attraction, and such it has remained ever since. The first conducted tours of the Center began in 1933 with male guides; these were replaced by women in 1943. Already by 1937, a quarter of a million people were annually visiting the observation tower while 1,500 people daily went through the studios of NBC. It was reckoned as a "first-class tourist attraction" by a literary monthly in 1938⁸⁰ and is today visited daily by an estimated 160,000 persons on business or pleasure bent.

Despite that "last rivet" driven in 1939, the Center continued to grow, and the period from 1946 to the present day has been one of expansion and modernization. In 1953 Rockefeller Center, Inc., sold to Columbia University parcels of land facing the east side of the Avenue of the Americas from 48th to 51st Streets. The Center had acquired this land during the 1920's and 1930's. Immediately after the sale, Columbia leased the property back to the Center.

The Center leapt over the boundaries of the original three-block site when it began construction of the Esso Building (now the Warner Communications Building), located between 51st and 52nd Streets, opposite Rockefeller Plaza. Designed by Carson and Lundin, it was completed in 1947. In 1954 the Center Theatre was demolished, and the United States Rubber Company Addition, designed by Harrison and Abromowitz, was built on the site; it was opened in 1955. In 1960, the original RKO Building and the Time-Life Building, vacated by their original tenants, were renovated and renamed for their new tenants, American Metal Climax and General Dynamics (since renamed the One Rockefeller Plaza Building), respectively. The last addition to the original plot came when the Center purchased the Sinclair Oil Building in 1963. Fronting on Fifth Avenue between 49th and 48th Streets, this structure, designed by the architects Carson and Lundin, conformed to the general stylistic standards of the Center and served to round out the original tract.

The last phase of Rockefeller Center's history has involved expansion both north along the Avenue of the Americas and – most recently – across it. Both expansions represent a departure from the original concept of a tightly organized complex of buildings around a central plaza. The first venture outside the old boundaries was the new Time-Life Building across the Avenue of the Americas from the Music Hall. Owned by a new joint company, Rock-Time Inc., the building was opened in 1959. It was the first skyscraper built along the Avenue after World War II and was to prove influential in revitalizing this area.

In 1960, Rockefeller Center repeated the formula, joining with Uris Buildings Corporation to erect the Sperry Rand Building just north of the Center on the east side of the Avenue. Both of these new ventures are managed by Rockefeller Center, Inc. In 1963, the New York Hilton at Rockefeller Center was opened. Based on the designs of the architect William Tabler, it was jointly owned by Hilton Hotels Corporation, Uris and the Center and is operated by Hilton. Rockefeller Center sold its interest in the hotel in 1969.

The most recent phase of this new program of expansion is represented by three new skyscrapers along the west side of the Avenue of the Americas – the Celanese Building between 47th and 48th Streets and the McGraw-Hill Building between 48th and 49th Streets, both designed by Harrison & Abromowitz & Harris; and the Standard Oil (New Jersey) Building between 49th and 50th Streets, jointly designed by Harrison, Abromowitz & Harris and Welton Becket & Associates. Although separated from the Center proper by the traffic of the Avenue, these new buildings will be interconnected by a system of street level malls (Fig. 34) and subterranean concourses which will incorporate stores, restaurants, and services in their lower stories. This marks an encouraging reversal of the all-too-prevalent trend along the Avenue – i.e., of placing free-standing towers in empty, windswept plazas, creating fundamentally negative spaces which are the reverse of the dynamic urban vessel of the original Rockefeller Plaza.

The Terminal and the Center – Paradigms for the Future

The extraordinary durability and continued vitality of these two complexes – Grand Central Terminal and Rockefeller Center – derive from common properties which have little to do with architectural esthetics in any conventional sense. I have called them generators of urban energy, reciprocating engines of urban life. That they have been able to function so effectively in this capacity is directly traceable to three critically important aspects of their physical configuration – their volumetric organization, their size, and their geographic location within the city.

These three aspects may have been empirically arrived at (though historical analysis has shown the original promoters to have been very far-sighted in this respect). Historically, their validity has been established beyond any possible doubt. Indeed, so powerful have they been as generators that they have survived a certain amount of expansion of size and alteration in volumetric organization. Thus, as we have seen, the Center has leapt across its original boundaries, even if with diminished viability; and the erection of the Pan Am Building did not, after all, completely destroy the effectiveness of the Terminal complex. *But it is impossible to suppose that these centers can be endlessly manipulated without irreversibly weakening, if not indeed destroying, their truly awesome power.*

In a period of accelerating obsolescence, when the effective economic (*not* physical) life span of buildings is being sharply reduced, the stability of these centers is remarkable. This stability is, paradoxically, the mark of their internal dynamism, their capacity to accept and adapt to changes in tenancy. It is very important that the actual sources of this dynamism be properly understood. All buildings act as the container of some specific set of activities; but few of them become nodal points of growth. It is obvious, for example, that a building must have a certain minimal size ("critical mass") in order for it to affect the equilibrium of the neighborhood around it. But size alone is not enough. The Empire State Building, at 34th Street and Fifth Avenue, was not merely for decades the tallest building in the world. It was, and still is, one of the largest agglomerations of office space. In sheer volume, this is not much less than the cubage of the four low pavilions and the RCA tower — in short, the buildings which function as the walls of the T-shaped roofless, urban vessel of the Center. Yet the impact of the Empire State Building upon its environs has been negligible. Neither the character of commercial activity along its bounding streets nor the physical condition of its neighboring buildings have shown much change — if anything, the slow decline of that section of Fifth Avenue has continued. On the other hand, as we have seen, the sheer presence of Rockefeller Center has altered the entire midtown section of Manhattan.

The lesson seems clear. The actual shape of the urban spaces it creates plays a critical role in the effectiveness of a given building or group of buildings. In the case of the Empire State Building, the negative spaces created by the gridiron street pattern were unaltered: pedestrian activity "bleeds away" down the open-ended, traffic-clogged streets. Indeed, both canyon effect and traffic congestion were aggravated by the sheer presence of the Empire State Building. In the case of Rockefeller Center, on the contrary, an enclosed, landscaped and traffic-free plaza creates a centripetal pedestrian activity of immense power and vitality.

But if Rockefeller Center is a demonstration of the importance of *physical configuration* to an effectively functioning center, then Grand Central demonstrates the critical importance of *geographic location*. This becomes immediately apparent if we contrast its urbanistic impact with that of Pennsylvania Station. The Pennsylvania was as comprehensive and up-to-date in its layout and facilities as the Grand Central; it was, if anything, more advanced architecturally — certainly, the glazed skeletal vaulting of the now-vanished Concourse was one of the most significant architectural accomplishments of the forepart of the century. In terms of both commuters and long distance travellers, it generated as much traffic as Grand Central. And, in the heyday of train travel, this traffic was as affluent as that anywhere.

Yet the Pennsylvania, in its half century tenancy of the site bounded by Seventh and Eighth Avenues between 31st and 33rd Streets, seems to have had surprisingly little impact upon its immediate environs. Far from accelerating the development of the area, it permitted a fairly steady decline in quality. Despite the nearby agglomeration of some of the world's largest department stores (Macy's, Gimbel's, Saks) and several contemporaneous hotels (including the old Pennsylvania directly across the street and the McAlpin on Herald Square), this district never generated activity in any way comparable to that around Grand Central Terminal.

Why this astonishing difference in the behavior of two urban vessels so similar in function, size and physical configuration?

The Pennsylvania enjoyed a far less strategic location with reference to the economic geography of the Island. While Grand Central Terminal sat firmly astride the intersection of three important subway lines (the north-south Lexington Avenue, the east-west shuttle and the Queens lines), Pennsylvania Station was, for many years, directly served only by the Broadway-Seventh Avenue Subway. (The BMT Subway and Sixth Avenue Elevated were a short uptown and a very long cross-town block away and the Eighth Avenue line was not opened until 1932 and the Sixth Avenue in 1940). Although 34th Street has always been an important crosstown artery, well equipped first with trolleys and then with buses, it lacked the life-giving artery of cross-town subways such as those under 42nd Street.

But the Pennsylvania had another geographic liability beyond poor access to mass transit — namely, that it lay well to the west of the main channels of advance and development up the Island. For reasons even now not entirely clear, this was narrowly channeled along Broadway, and Fifth, Madison and Park Avenues. This current had astonishingly steep "banks," never extending more than a hundred feet or so along the cross-town streets; moreover, as we have already observed, it had an astonishingly short

span of optimal activity. For a few decades, the first Waldorf-Astoria and Altman's department store had stabilized the fashionable residential hinterland of Murray Hill (J.P. Morgan had lived at 35th Street and Madison Avenue from 1880 until his death in 1913). But already by the end of World War I, the northward surge of fashionable activity had resumed.

If the above assumptions are even approximately correct, then it is apparent that both Grand Central Terminal and Rockefeller Center are unique at two

quite different levels — as prototypes for further study and as functioning centers whose continued vitality is critical for Manhattan. Any steps which serve to consolidate and extend this viability are much to be desired; any which would vitiate it (e.g., the proposal to build a tower atop the Terminal or the rumored plan for a new tower over the sunken plaza at Rockefeller Center) must be rejected at all costs. It is literally vital to the city's life that these two great engines be protected and preserved.

Population of Manhattan
1790 – 1900

1790	33,131
1800	60,515
1810	96,373
1820	123,706
1830	202,589
1840	312,710
1850	515,547
1860	813,660
1870	942,292
1880	1,164,673
1890	1,441,216
1900	1,850,093

Fig. 1. Population growth of New York City, 1790-1900. Soaring increases, especially after the War of 1812 and the opening of the Erie Canal, demanded a comparable physical expansion of the city.



Fig. 2. Commissioner's Map of New York City, 1811. The decision to abandon the irregular street pattern of the eighteenth century in favor of a regular gridiron undoubtedly simplified land-platting. But it also meant the obliteration of natural topographic features under a uniform carpet of graded streets and cut-and-filled lots.



Fig. 3. Grand Central Depot, New York, 1869-1871, John B. Snook, architect. This 1874 view toward the north along Fourth (now Park) Avenue shows the original grade conditions of the complex before construction of the elevated drive across 42nd Street.



Fig. 4. Grand Central Depot, c. 1886. This photograph of the 42nd Street facade also shows the annex of 1885 along the western flank of the building.



Fig. 5. Train shed, Grand Central Depot, R.G. Hatfield, engineer. This 1873 view shows the arch-ribbed shed shortly after opening. Note the horse-drawn cars at the right and the glass-and-metal curtain wall at the northern end.



THE STONE VIADUCT FROM 99TH TO 115TH STREET—THE STATION AT 110TH STREET.



ELEVATED WALK FOR FOOT PASSENGERS BETWEEN 52D AND 53D STREETS.

Fig. 6. Fourth Avenue Improvement Scheme, New York, c. 1873. At this stage of development, tracks ran on a masonry viaduct down to 99th Street and thence in a rock-cut tunnel and open cut down to the depot. The 110th Street Station is at left, and the pedestrian overpass between 52nd and 53rd streets at right.

FRANK LESLIE'S ILLUSTRATED NEWSPAPER

LEAF BY 15, 18

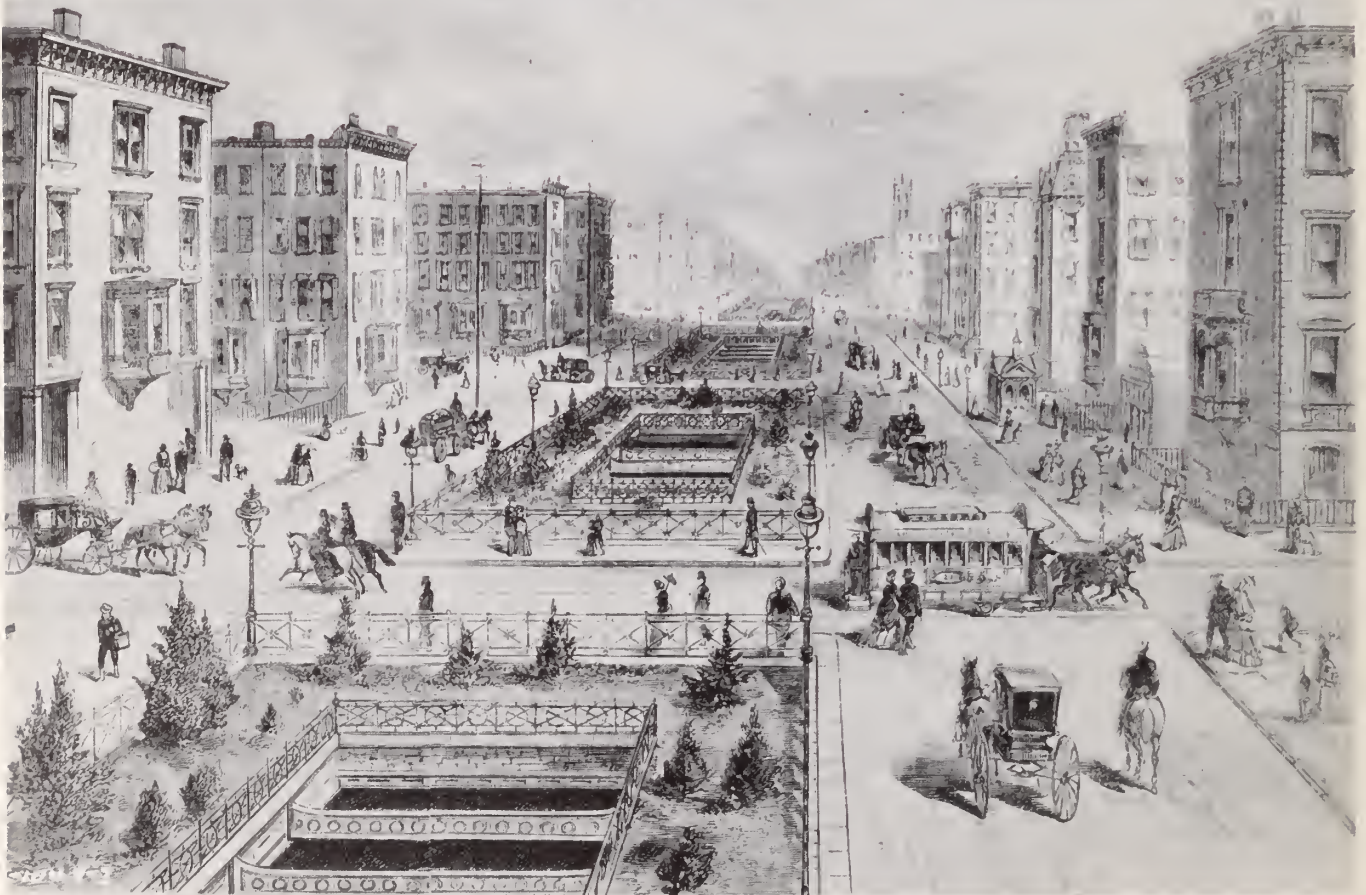


Fig. 7. Fourth Avenue Improvement Scheme. From 59th Street north to 76th Street the cut was partially covered by a landscaped mall which was pierced by railed-off openings to permit the escape of smoke from steam locomotives.



Fig. 8. North facade of the train shed, Grand Central Depot, c. 1888. This view shows a combination pedestrian and vehicular bridge across grade-level tracks.



Fig. 9. Marshalling yards, Grand Central Depot. This photograph, looking south from 46th Street, shows the conditions of the tracks and station about 1900.



Fig. 10. Main facades, Grand Central Depot after the remodelling of 1900. The original mansard roofs were removed to make way for three additional floors. Exterior walls were resurfaced with rusticated stucco.



Fig. 11. New marshalling yards, Grand Central Terminal. This 1909 photograph shows the extraordinary ways in which new tracks, platforms and station house were constructed without interruption to service over 600 local and long-distance trains per day.

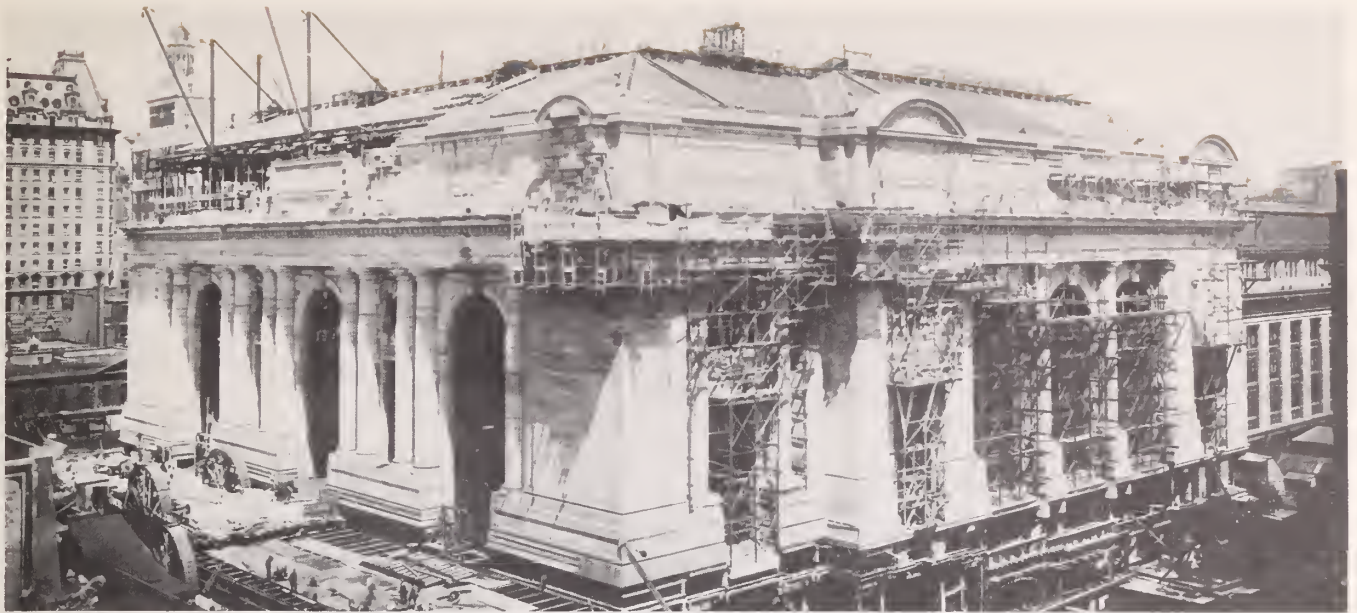


Fig. 12. Grand Central Terminal, 1903-1913, Warren and Wetmore, architects. This 1909 view from the south of the new terminal in the Beaux Arts style shows the new elevated highway to carry Park Avenue traffic around the complex.



Fig. 13. South facade, Grand Central Terminal, c. 1930. Note newly finished Grand Central Office Tower in middle distance straddling Park Avenue between 45th and 46th streets.

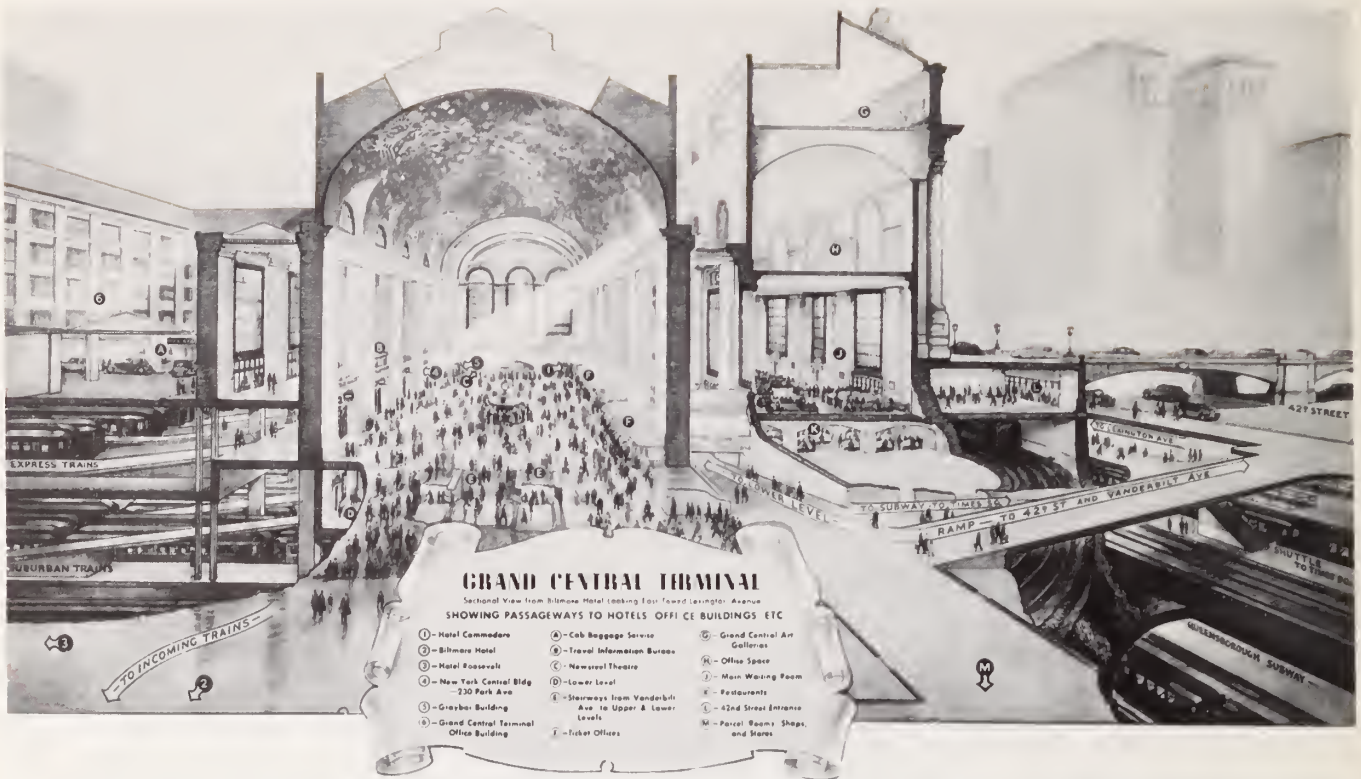


Fig. 14. North-south section, Grand Central Terminal. This view looking east towards Lexington Avenue indicates the sophistication of the circulation system with long-distance and commuting trains at left, subway and trolley cars at right, and connecting Concourse in center.

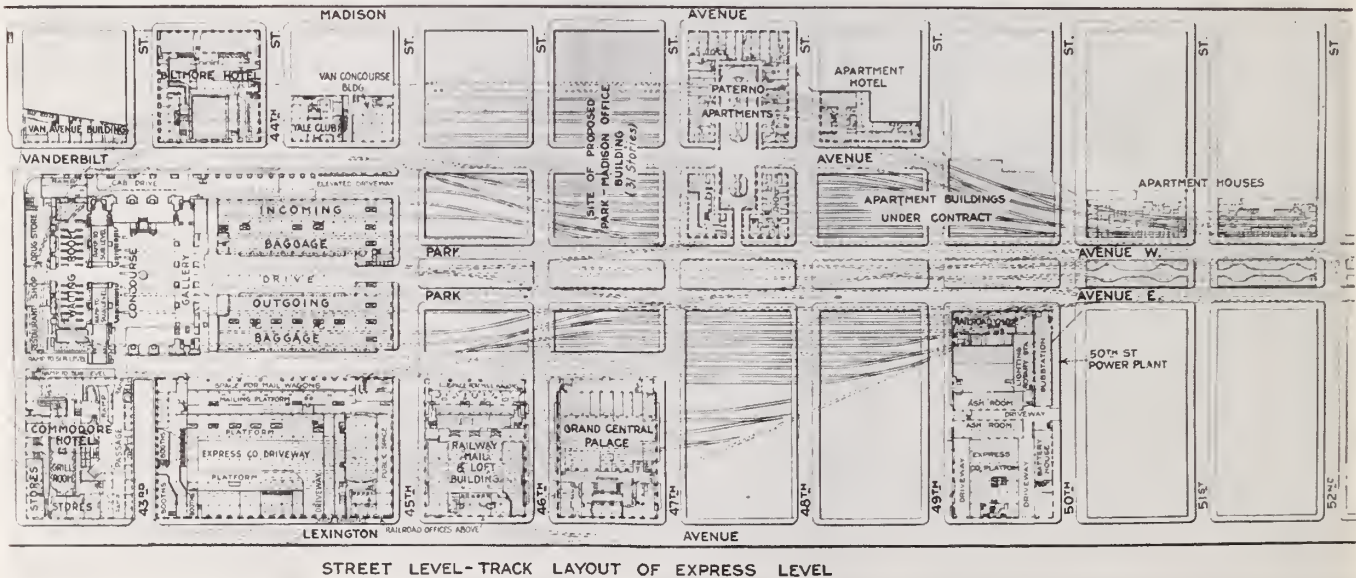


Fig. 15. Plot plan, Grand Central Terminal. Layout at street level, showing relationship between main concourse and gates to express platforms.



Fig. 16. Main Concourse (top) and underground pedestrian passages (bottom), Grand Central Terminal. The Concourse was one of the largest in the country and the system of underground services the most complete.

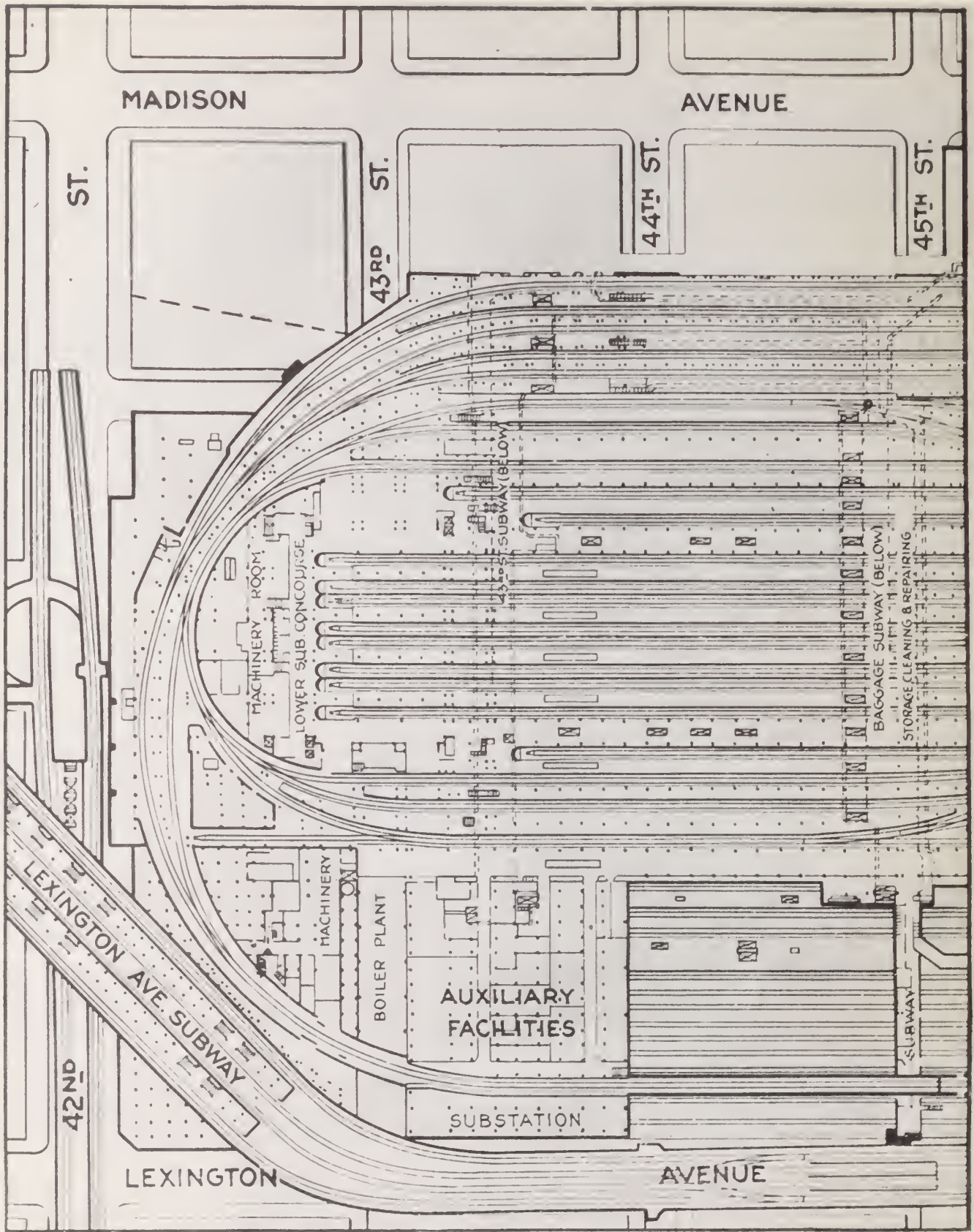


Fig. 17. Suburban train level, Grand Central Terminal. Suburban commuters had separate waiting rooms, ticket offices and platforms. Tracks were looped around the head of platforms to minimize need for "backing out" of station.

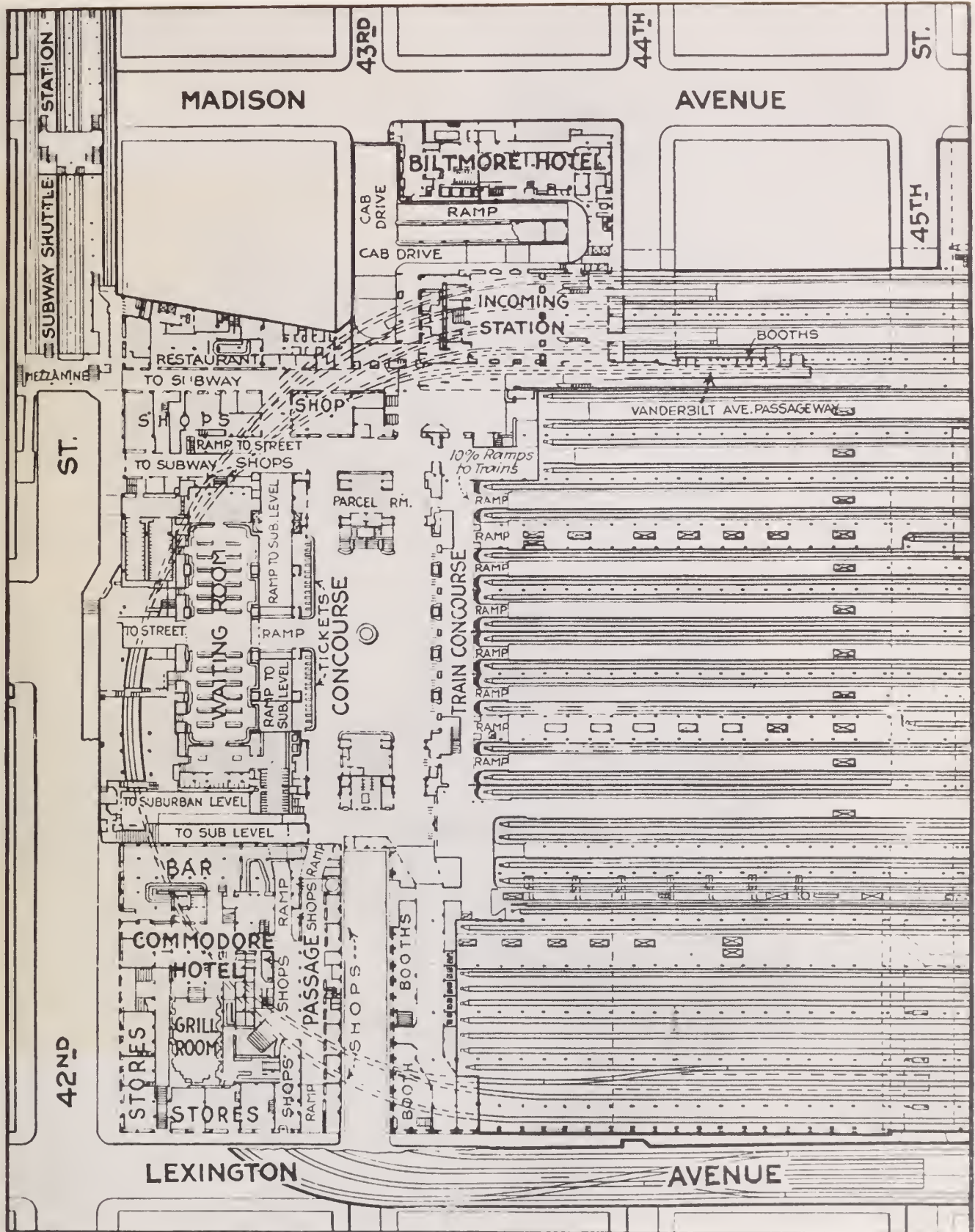


Fig. 18. Long-distance train level and Concourse, Grand Central Terminal. A system of easy ramps made possible stair-free movement from train platforms into the Concourse and out onto sidewalks.

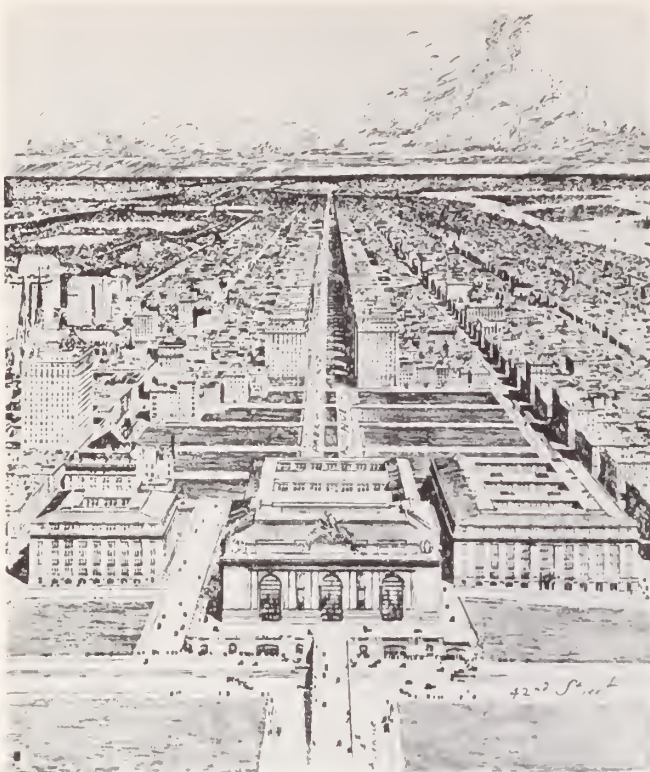


Fig. 19. Bird's-eye view, Grand Central Terminal, This drawing, looking north up Park Avenue shortly after the completion of the station, shows vacant spaces over submerged tracks. All of these had been built upon before 1920.

Fig. 20. Pan Am Building, New York, 1963, Emery Roth and Son, architects; Walter Gropius and Pietro Belluschi, consulting architects. This view up Park Avenue from 39th Street shows how radically the new tower has altered one of the city's most famous vistas.





Fig. 21. The Elgin Botanic Gardens, New York, c. 1806. One of the largest and most sophisticated horticultural projects in the nation, the gardens included heated glass hot houses for tropical plants and a cooler greenhouse for less delicate plant materials.



Fig. 22. Single family residence, 4 West 54th Street, New York. This 1859 photograph, which shows the property purchased in 1885 by John D. Rockefeller, gives a vivid picture of the partially-developed character of mid-town Manhattan just before the Civil War.



Fig. 23. Fifth Avenue, New York. This 1890 view, looking north from 48th Street, shows this portion of the avenue at the pinnacle of its fashionable residential phase. Rockefeller Center was to occupy the western side opposite St. Patrick's Cathedral, which was designed by James Renwick and built between 1859 and 1879.



Fig. 24. Future site, Rockefeller Center, New York. This 1931 view, looking southeast from 51st Street and Sixth Avenue (now Avenue of the Americas), shows how monolithic ownership by Columbia University had preserved the low-level residential scale.



Fig. 25

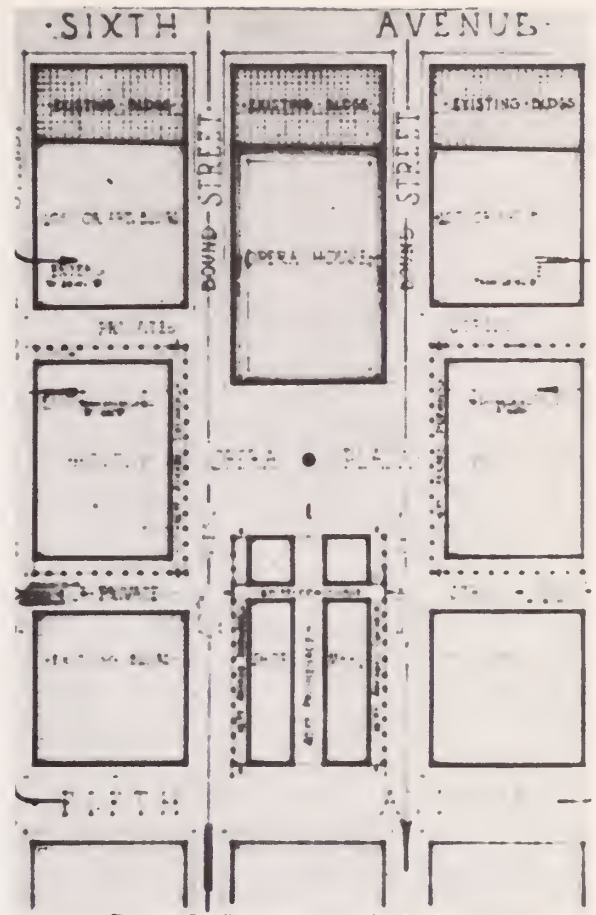


Fig. 26

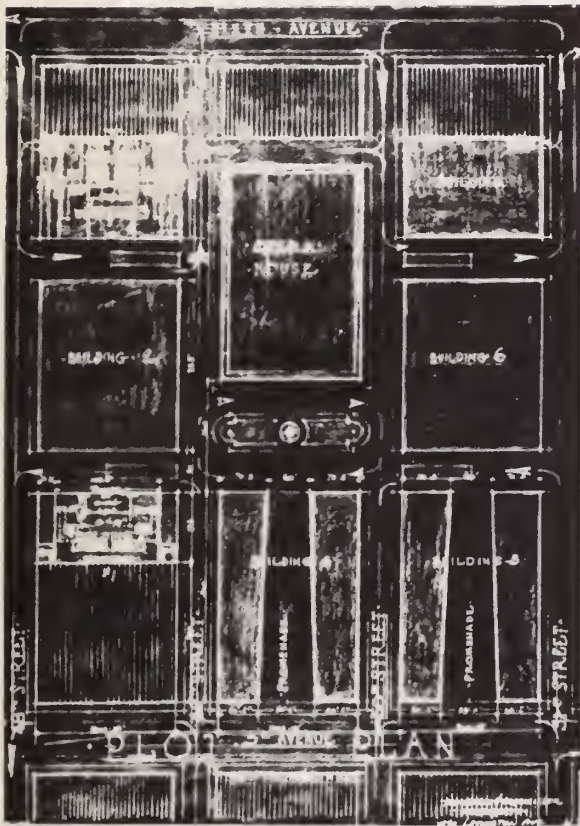


Fig. 27

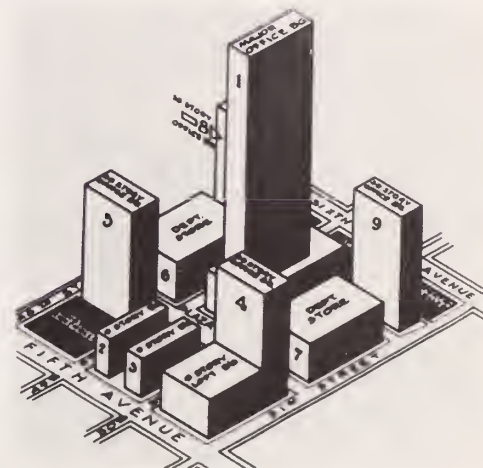


Fig. 28

Fig. 25. "Metropolitan Club Scheme," Benjamin Wistar Morris, architect. This design, dated May, 1928, shows the earliest proposal for the development of the area between 48th and 51st streets.

Fig. 26. Plot plan of "Labor Day Scheme," Reinhard and Hofmeister, September, 1929. This early design establishes some fundamental features of the future center, including a central traffic-free plaza. The opera house is still the centerpiece of the design.

Fig. 27. Revised plot plan of November 23, 1929, Reinhard and Hofmeister, architects.

Fig. 28. Isometric study for Rockefeller Center, Reinhard and Hofmeister, architects. In this scheme of January, 1930, a high rise office building (the future RCA tower) has replaced the opera house as the centerpiece of the design.



Fig. 29. Aerial view, Rockefeller Center, 1964, looking west from 48th Street and Fifth Avenue.



Fig. 30. Aerial view, Rockefeller Center, 1932, looking east across Avenue of Americas.



Fig. 31. International Group, Rockefeller Center. The landscaped rooftops of the low buildings along Fifth Avenue became one of the Center's best known features despite the fact that they were never opened to the public.



Fig. 32. Channel Gardens and Plaza, Rockefeller Center. This view from Fifth Avenue encompasses the heart of the project and a fundamental reason for its immediate and continuing success -- a traffic-free, landscaped enclave in the gridiron pattern of the city.

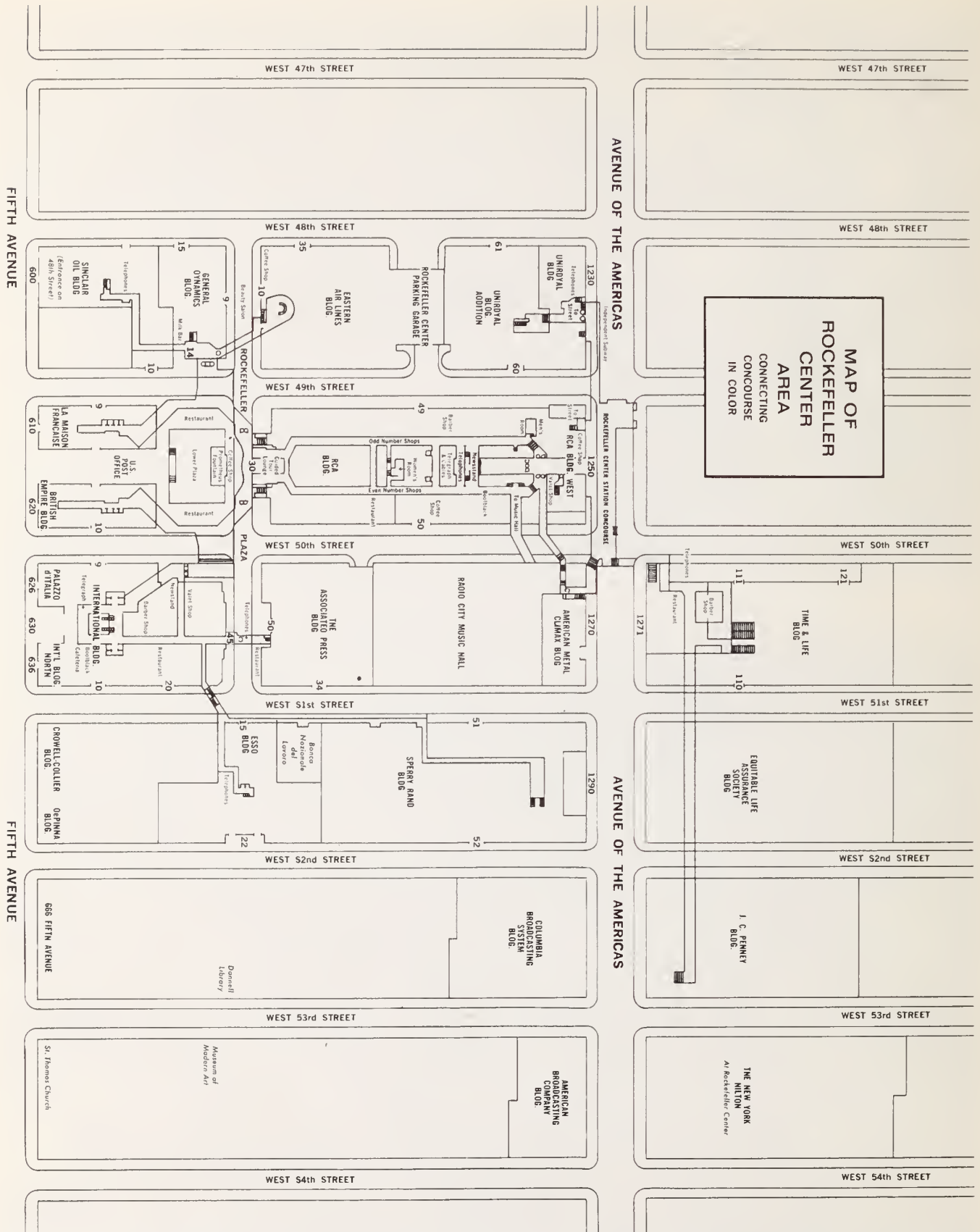


Fig. 33. Site plan, Rockefeller Center, c. 1960. This drawing shows the system of underground shopping concourses which played such an important role in the success of the project. The McGraw-Hill and Standard Oil-New Jersey Buildings, which now occupy the blocks between 48th and 50th streets along the Avenue of the Americas, will be linked up with this concourse system.

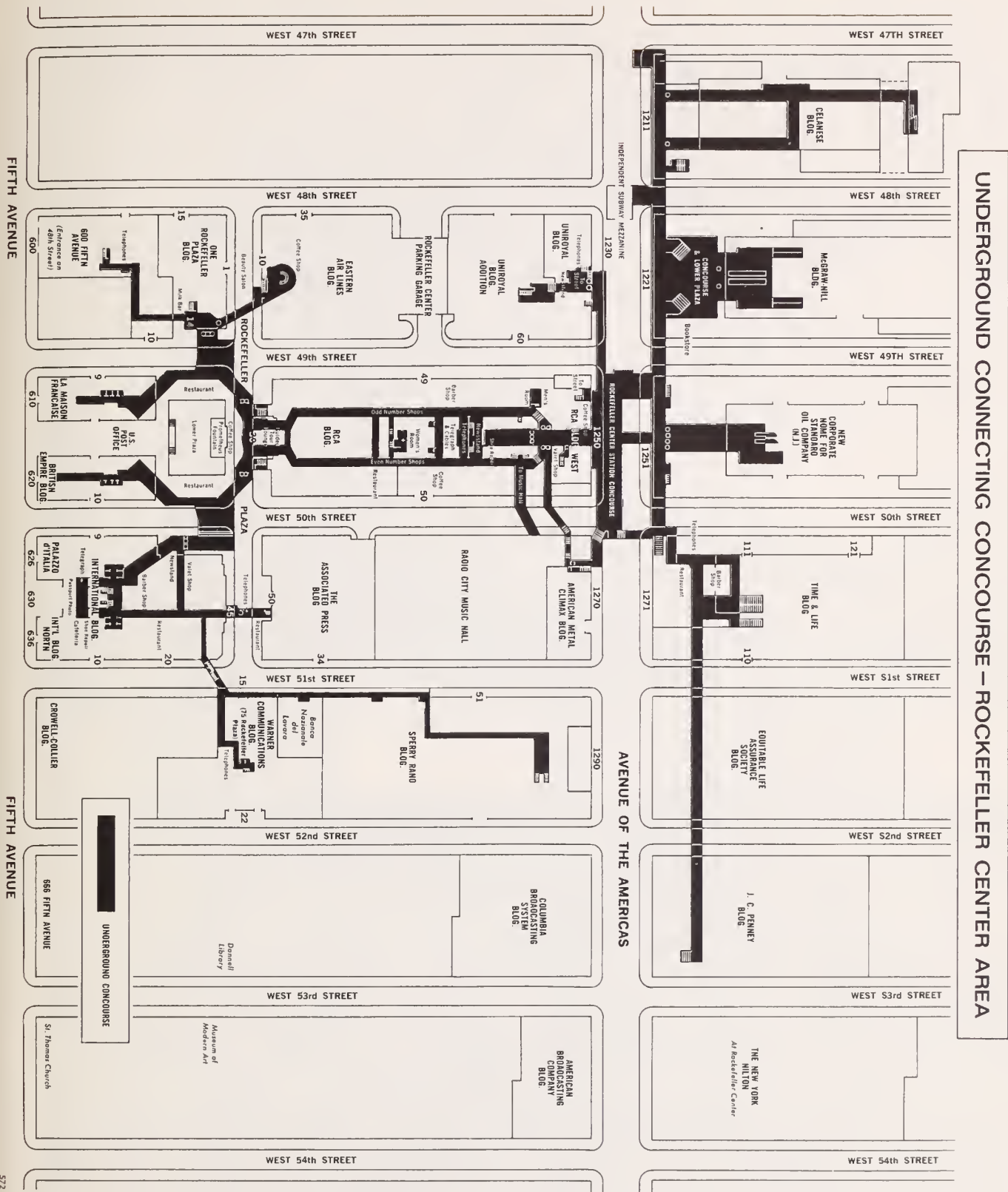


Fig. 34. Site plan, Rockefeller Center, 1972.



Fig. 35. Sunken Plaza, Rockefeller Center in winter. Despite its comparatively small size and undistinguished design, this landscaped enclave has proved to be one of the most effective generators of urban activity in midtown Manhattan.



Fig. 36. Underground concourse, Rockefeller Center.



Fig. 37. The new Rockefeller Center buildings from 47th and 50th streets on the west side of the Avenue of the Americas plus the Time and Life Building just to the north. A pleasant vertical connection between street level and the new subterranean concourse is afforded by five new stairways.



Fig. 38. Philadelphia Saving Fund Society, Philadelphia, 1932, Howe and Lescaze, architects.

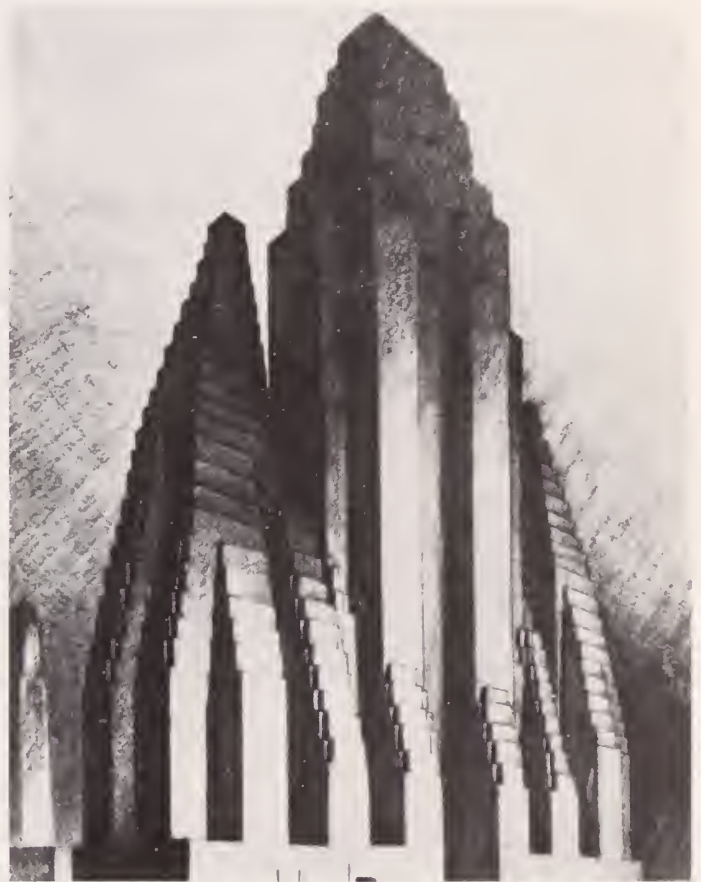


Fig. 39. Zoning study, Hugh Ferriss, delineator. Aimed only at explaining the "ziggurat effect" of the New York City zoning regulations of 1916, the Ferriss drawings were influential in 1930 visions of the future.



Notes

- ¹John W. Reys, *The Making of Urban America* (Princeton: Princeton University Press, 1965), pp. 296-298.
- ²William J. Wilgus, "The Grand Central Terminal in Perspective," *Transactions of American Society of Civil Engineers*, paper No. 2119, p. 996.
- ³*History of Real Estate, Building and Architecture in New York City During the Last Quarter of a Century* (New York: Record and Guide, 1898), p. 65.
- ⁴*Maps of the City of New York* (New York: William Perris, 1859), n.p.
- ⁵Wilgus, pp. 996-997.
- ⁶Carl Condit, *American Building* (Chicago: University of Chicago Press, 1968), p. 134.
- ⁷Wilgus, p. 997.
- ⁸"The Improvement of Fourth Avenue," *Frank Leslie's Illustrated Newspaper*, February 15, 1873, pp. 370-372.
- ⁹Wilgus, p. 998.
- ¹⁰*Ibid.*, p. 999.
- ¹¹*Ibid.*
- ¹²*Ibid.*
- ¹³"The Remodeled Grand Central Station," *Railroad Men*, XII (July, 1899), 142.
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